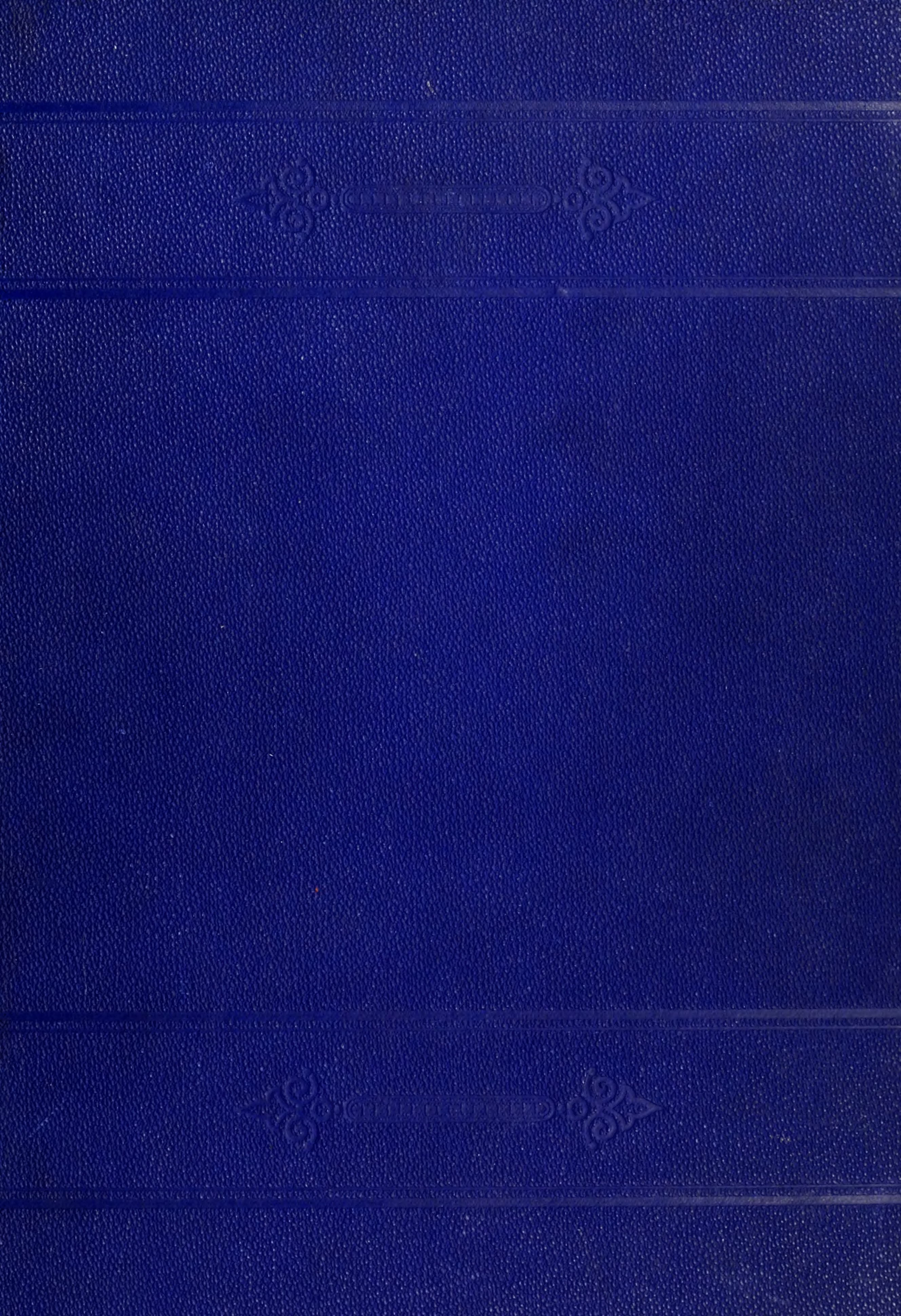

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THE AQUATIC RESOURCES OF THE HAWAIIAN ISLANDS.

BY

DAVID STARR JORDAN

AND

BARTON WARREN EVERMANN.

Section II. THE DEEP-SEA FISHES.

BY

CHARLES HENRY GILBERT, Ph. D.

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II. THE DEEP-SEA FISHES OF THE HAWAIIAN ISLANDS.

BY

CHARLES HENRY GILBERT, Ph. D.,
Professor of Zoology, Leland Stanford Junior University.

II.—THE DEEP-SEA FISHES OF THE HAWAIIAN ISLANDS.

By CHARLES HENRY GILBERT, Ph. D.

Professor of Zoology, Leland Stanford Junior University.

The second season of investigations by the U. S. Fish Commission in the Hawaiian Islands—the period from March to August, 1902—was devoted primarily to the study of the fauna of the deeper waters. The work was conducted from the steamer *Albatross*, under the general supervision of Dr. David S. Jordan and Dr. Barton W. Evermann. The writer, as naturalist in charge, had immediate responsibility for the scientific conduct of the cruise, and was ably assisted by Prof. Charles C. Nutting, of the University of Iowa, and by Mr. John O. Snyder and Mr. Walter K. Fisher, of Stanford University.

An exhaustive survey was attempted of all offshore fishing banks, and a thorough exploration of the channels between the islands and the deeper slopes out to the 1,000-fathom line. The region to be covered included the Hawaiian Islands proper, and the series of shoals and reefs, with infrequent rock islets, which form a continuation of the Hawaiian group to the northwest. The westernmost point to be reached was the island of Laysan. As thus outlined, the area to be explored comprised a narrow strip reaching from 18° to 26° north latitude and from 156° to 172° west longitude, and extending from southeast to northwest a distance of 1,300 miles.

The investigation proved extremely difficult on account of the nature of the sea bottom, which, at all depths, was such as to render dredging very arduous and uncertain. The configuration of the ocean floor was for the most part irregular, with steep slopes. Even in those localities of limited extent where the slopes were gentle and uniform, and were covered with fine sediments, the trawl was likely at any time to encounter masses of coral, or outcroppings of lava, or even in the deeper waters consolidated oozes, all of which worked disaster to the gear and prevented successful results. Of the 344 trials with tangles, dredge, or trawl, about one-third were total failures, and many of the others were nearly barren of results. The use of the trawl for commercial fishing is out of the question in any part of this region, with the possible exception of a small district lying off the harbor of Kahului, on the island of Maui, where there is a smooth sand bottom on which a commercial trawl could be safely worked. So far as known, however, there are no market fishes to be had there in abundance, and the region is too far from any center of population.

The most successful trawling grounds for scientific purposes were found between 200 and 400 fathoms along the seaward extensions of the Pailolo and Kaiwi Channels, which lie between Maui and Molokai and between Molokai and Oahu. Toward the northeast these channels soon open upon a nearly level plateau, 10 to 15 miles in width, carrying a depth of about 300 fathoms. The sediments are fine sand and mud, and are in certain lines comparatively free from obstructions. At the seaward edge of this plateau, however, foul bottom is at once encountered, and a steep and wholly impracticable slope leads abruptly down to oceanic depths. For depths of less than 200 fathoms the richest ground discovered was undoubtedly the inter-island portion of the Pailolo Channel, where a bottom of dead shells and corallines proved very productive. Off Kahului on Maui, as already stated, and off Honolulu and Waialua on Oahu, are gentle sandy slopes where dredging is possible out to 300 fathoms, but the inshore portions are comparatively barren. Beyond 400 fathoms no satisfactory working grounds could be found in any part of this region. The best that were discovered lie off the eastern shore of Kauai. Here life was abundant and the forms discovered were of extreme interest, but the bottom had a rapid seaward slope and was treacherous. By dredging parallel with the shore line, successful hauls were occasionally made, and most of our material from depths greater than 400 fathoms came from this locality. The series of shoals to the northwest of the Hawaiian group were left practically unexplored. The single trip to Laysan Island was devoted largely to hydrographic work; hence a few dredge hauls in the vicinity of Laysan and a series near Bird Island represent the meager biological results obtained from the western portion of the cruise. No truly bathybial fishes were secured at Laysan, but the reef species and those of the shore platform out to 100 fathoms indicated the unbroken extension of the Hawaiian fauna to include these islands and shoals.

The first contribution to the knowledge of Hawaiian deep-sea fishes appeared in 1897,[a] being based on the results of 8 dredge-hauls taken by the *Albatross* in 1891, in the Kaiwi Channel. Of the 26 species then secured, all but 5 were described as new. The probability entertained at that time that the slopes about the islands would be found to contain an assemblage of species largely distinct from those of any other region has been fully borne out by more extensive exploration. In the present paper there are recorded 111 species living at depths of 100 fathoms or more, and of these all are peculiar to the Hawaiian province, so far as is now known, except the 10 named below. *Squalus mitsukurii*, *Chimæra purpurescens*, and *Antigonia steindachneri* are known from Japan; *Synodus kaianus* and *Nannobrachium nigrum* are forms occurring in the East Indies; *Serrivomer beanii* and *Caulolepis longidens* are supposed to inhabit both coasts of the United States; *Antimora microlepis* is from the Pacific coast of North America; and *Neoscopelus microlepidotus* and *Sternoptyx diaphana* are species of partly pelagic habit, ranging widely in both Atlantic and Pacific. In the case of *Squalus*, *Chimæra*, and *Antimora*, it has been possible to make direct comparison of specimens, but with the others mentioned, identification is based on comparison with published descriptions and figures only.

An analysis of the list of species recorded in the present paper shows conclusively that the bathybial fishes of Hawaii, like those of its reefs and shores, have been derived as a whole from the west and south, and not from the east or north. In its entire facies, the fauna is strikingly unlike that of the Pacific coast of Mexico and Central America, and resembles strongly the assemblage of forms discovered by the *Albatross* and the *Challenger* off the coasts of Japan and the East Indies. Some of its members find their nearest known affines in the Bay of Bengal. In addition to the identical species already mentioned as occurring in Japan or the East Indies, the list includes species of the following genera: *Promyllantor*, *Polyipnus*, *Macrorhamphosus*, *Ichthyocampus*, *Pegasus*, *Polymixia*, *Antigonia*, *Stethopristes*, *Cyttomimus*, *Aracana*, *Tænianotus*, *Bembradium*, *Hoplichthys*, *Bembrops*, *Chrionema*, *Pteropsaron*, *Champsodon*, *Draconetta*, *Ateleopus*, *Pœcilopsetta*, *Tæniopsetta*, *Samariscus*, *Anticitharus*, *Chascanopsetta*, and *Chaunax*, all of which have close relatives in Japan, the South Seas, or the Bay of Bengal, but are quite unrepresented along the eastern shores of the Pacific. Even the more characteristically bathybial forms, such as the macrurids, indicate a similar relation, as is shown by the presence of *Gadomus*, *Melanobranchus*, *Optonurus*, *Hymenocephalus*, *Malacocephalus*, and *Trachonurus*. Among the above-named genera, *Polymixia*, *Antigonia*, *Gadomus*, *Melanobranchus*, *Hymenocephalus*, and *Malacocephalus* have close representatives in the eastern Atlantic as well as in the western Pacific, a fact of some interest when considered in connection with the known distribution of many shore forms of Japan and the South Seas, which are unrepresented along the Pacific coast of America, but are present either as identical or as closely related species in the Mediterranean and neighboring waters.

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[a] Gilbert, C. H., and Cramer, Frank: Report on the fishes dredged in deep water near the Hawaiian Islands, with descriptions and figures of twenty-three new species. Proc. U. S. Nat. Mus., vol. 19, 1897, pp. 403–435, plates 36–48.

In this paper are included all the fishes obtained with the dredge, trawl, or tangles, and also the scopelids among those taken at the surface. Other pelagic forms from the surface are reserved for a subsequent paper.

Family SCYLLIORHINIDÆ.

Catulus spongiceps, new species.

Type, adult female, 50 cm. long, from station 4151, vicinity of Bird Island, depth 313 to 800 fathoms; type, No. 51590, U. S. Nat. Mus.

Length of head, exclusive of branchial area, 22 hundredths of total length; horizontal diameter of eye 3; preocular length of snout 11.5; preoral length of snout 8.5; greatest width of head 15; interocular width 10.5; length of spiracle 1, slightly exceeding its distance from eye; least distance between nostrils 4.5; length of nostril 3.5; extreme width of mouth 12.5; width of attachment of pectorals 8.5; length of anterior pectoral margin 11.5; distance between pectorals and ventrals 11.5; base of ventrals 10; distance between ventrals and front of anal 3.5; base of anal 15; base of dorsals 7; distance between dorsals 10.5; length of caudal measured below, 29.

Body compressed and deep, its greatest width about $\frac{2}{3}$ its greatest depth; head depressed, the snout flat and rather broad; snout very soft and spongy, everywhere porous, the most conspicuous pores arranged in a pair of narrowly lanceolate patches on lower side of snout, each patch containing 2 series of pores in its posterior portion and 3 anteriorly; length of the patch equal to internarial width; nasal valves widely separated, the anterior and posterior terminating in thickened rounded lobes, and bearing no cirrus; spiracles behind eye and a little below its longitudinal axis; front of upper jaw well in advance of eye, its angle slightly in advance of vertical from hinder margin of orbit; a thick fold at angle of mouth continued on lower jaw half the distance to symphysis, and along upper jaw three-fourths as far; teeth typically with 5 cusps, but sometimes with either 4 or 3; lateral cusps better developed in the lower jaw than in the upper, and stronger on the sides than in the middle of each jaw; 18 oblique rows in each side of upper jaw.

Dorsal fins of equal length and height, separated by an interval 1.5 times their length at base, which equals half the width of the mouth; anterior dorsal inserted largely above base of ventrals, not more than one-fourth its base being behind them; second dorsal originating above middle of anal fin and terminating slightly in advance of its end; base of anal fin 2.3 times that of second dorsal, and 4 times its distance from base of ventrals; pectoral with a long base, the length of which equals its distance from base of ventral; pectoral short, rounded, its tip scarcely reaching half way to base of ventrals.

Skin densely covered with minute slender spines, which bear no cusps at their bases; margins of fins and an area behind each of them naked.

Color uniform warm brown.

Only the type is known, an adult female containing a mature egg in each oviduct.

Family SQUALIDÆ.

Squalus mitsukurii Jordan & Snyder.

Station 4085, north coast of Maui, 267 to 283 fathoms.

Etmopterus villosus, new species. Plate 66.

Type, 170 mm. long, from station 3824, off the south coast of Molokai, depth 222 to 498 fathoms; type, No. 51583, U. S. Nat. Mus.

Length of head to first gill-cleft 22.5 hundredths of total length; interorbital width 8; preoral length of snout 11; preocular length of snout 8; least distance between nostrils 4; longitudinal diameter of orbit 7; distance between spiracles 7.5; width of mouth 11; distance from tip of snout to first dorsal spine 38; length of first dorsal spine 5; base of first dorsal 6; space between dorsals 16; length of second dorsal spine 8; base of second dorsal 6; length of upper caudal lobe 24; length of pectoral 10.

Lateral margins of snout nearly parallel, the terminal portion very abruptly and bluntly rounded; width of snout equal to that of interorbital space; anterior nasal flap narrow and pointed, the posterior widened horizontally and concave on its anterior face; longitudinal diameter of eye slightly exceeding half interorbital width; spiracle a short transverse slit, its length one-fifth the interval between spiracles; mouth wide, little arched, the extreme width equaling preoral length of snout; fold at angle of mouth well developed and continued for a short distance along both jaws, its length from angle of mouth equaling to $\frac{2}{7}$ preoral length of snout; upper teeth in 27 transverse rows, most of the teeth functioning at the same time; each tooth with a central point and a pair of shorter lateral cusps; but one functional series of 29 teeth in mandible, forming an almost complete cutting edge, the single point of each tooth directed nearly horizontally away from the middle line.

Insertion of anterior dorsal spine midway between tip of snout and base of upper caudal lobe, and slightly nearer to second spine than to the line joining the spiracles; length of the first spine nearly equal to base of fin; interspace between dorsals equals distance from tip of snout to spiracles.

Skin thickly beset with small plates, which bear each a slender spine; along the back, and especially on the tail, these prickles are arranged in lengthwise series; fins largely smooth, with patches of prickles on their basal portions only; small areas immediately behind dorsal, pectoral, and ventral fins naked; lips and buccal groove, nostrils, spiracles, and eye naked, head otherwise uniformly covered.

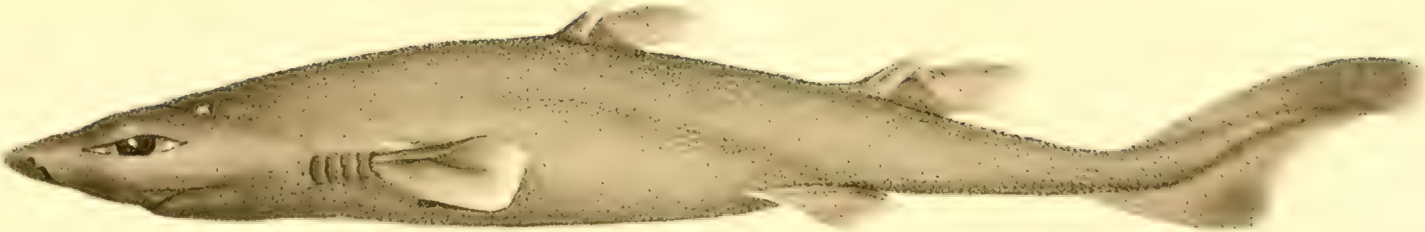
Color warm brown; lower side of head, breast, and abdomen purplish black; dorsals black on basal and anterior portions, broadly white otherwise; caudal lobes black, the intermediate portion light-margined; pectorals and ventrals dusky with white posterior edges.

Only the type known.

Centroscyllium ruscosum, new species. Fig. 230.

Type, 222 mm. long, from station 3997, vicinity of Kauai, depth 418 to 429 fathoms; type, No. 51585, U. S. Nat. Mus.

Length of head, exclusive of branchial area, 22 hundredths of total length; width of snout 12, slightly exceeding interorbital width; preoral length of snout 10, preocular length of snout 7; longitudinal diameter of eye 6.5; width of mouth 11; distance between spiracles 9; least distance between



ETMOPTERUS VILLOSUS GILBERT. TYPE.

nostrils 5; distance from tip of snout to first dorsal spine 36; length of first dorsal spine 5; base of first dorsal 6; distance between dorsals 17; length of second dorsal spine 8; base of second dorsal 7; length of upper caudal lobe 25.

Width of snout slightly more than half length of head measured to first gill-cleft; anterior nostrils opening in the anterolateral margins of snout, large, round, directed forward; anterior nasal valve broad and triangular, completely overlapping posterior valve, which is horizontally expanded and somewhat intricately folded; distance between inner angles of posterior nasal slits half the length of preoral portion of snout; eyes very large, equaling the axial length of snout in advance of orbits; distance between angles of mouth very slightly less than half length of head; a short fold extending backward from angle of mouth for a distance less than its continuation forward alongside of either jaw; the upper and lower labial folds are equal in length, and but little more than half diameter of pupil; teeth small, equal and similar in both jaws, each consisting of a central cusp and a smaller pair of lateral cusps; several series of teeth function at the same time in each jaw; lower surface of snout studded with large pores, some of these forming a narrow V-shaped patch between the nostrils; pores on upper surface of snout arranged in 2 linear patches which extend along upper margins of orbits and are continuous anteriorly with the arms of the inferior V-shaped patch; the spiracles are transverse slits, well behind orbits, and slightly behind angles of mouth, their length one-third diameter of orbit, the distance between them equal to length of snout.

First dorsal spine inserted well behind pectoral axil, slightly nearer extremity of snout than base of upper caudal lobe, and midway between second dorsal spine and spiracle; second dorsal spine midway between first dorsal fin and base of upper caudal lobe; distance between ventrals and pectorals equal to length of head (exclusive of gill-region). The type is a young male, in which the claspers do not nearly extend to margin of ventral fins.

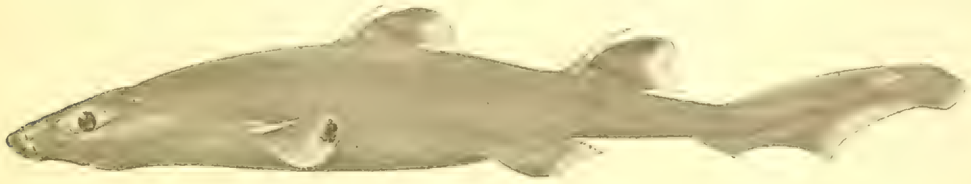


FIG. 230.—*Centroscyllium ruscosum* Gilbert, new species. Type.

Head and body smooth in the young (type specimen), with a very few minute scattered prickles, somewhat more numerous along sides of tail, and wholly wanting on anterior part of body, on fins, and on head. Cotype hispid.

Lower parts black, shading into a light brown near median dorsal line; paired fins and dorsals blackish, with wide white margins; caudal lobes uniform blackish, the lower intervening portion of fin lighter, but not white.

An adult male, 40 cm. long, from station 3989, vicinity of Kauai, 385 to 500 fathoms, is considered a cotype of this species, but the snout and head generally are so badly distorted as to make comparisons difficult. The entire head and body are covered with rather distinct fine prickles, borne upon small stellate bases. Many of the teeth have 4 or 5 cusps, a small outer cusp being frequently developed at the base of one or both lateral cusps. The claspers are fully developed and reach more than half way from their inner base to the origin of the lower caudal lobe, each bearing near its tip a pair of lateral slender hooked spines, between which is a median soft prolongation tapering rapidly to a point and bearing the distal prolongation of the groove. White margin of fins narrower than in the type.

This species is closely allied to *C. niger* Garman, from the vicinity of the Galapagos Islands, but seems to differ in proportions of eye and snout, and in certain details of position of the fins. The prickles seem also more numerous and finer. Nothing can be said concerning its relations with *C. ornatum* Alcock, from the Bay of Bengal and the Arabian Sea.

Only the type and the cotype known.

Family CHIMÆRIDÆ.

Chimæra purpurescens, new species. Fig. 231.

Type, a female, 90 cm. long, from station 4183, vicinity of Kauai, depth 957 to 1,067 fathoms; type, No. 51592, U. S. Nat. Mus.

Head and body very robust, deep and compressed, depth 4.4 in length measured to end of second dorsal fin; snout high and compressed, without appendages, protruding beyond nostrils for a distance about equaling diameter of orbit; eye large, nearly circular, the diameter of exposed portion very slightly exceeding the interorbital width, which is 0.2 the length of head; front of eye midway in length of head; distance from nostrils to tip of snout contained 2.8 times in length of head; anterior dental laminæ of upper jaw with 7 enamel rods on each side the median line; first and second enamel rods on each side of median line in lower jaw very widely spaced, ending in acute points with deeply concave border between them, the length of the points slightly exceeding anterior laminæ of upper jaw; four sensory canals intersect at a point vertically below hinder margin of orbit; one canal runs upward and backward from point of intersection in direction of dorsal spine, meeting, almost at right angles on level of upper rim of orbit, a line descending from the nape; posteriorly to the point of union, the latter describes a sharp curve with the convexity directed downward, and then becomes the lateral line, the undulations of which are few and faint.

Dorsal spine comparatively slender and nearly straight, containing no posterior groove, and not serrate along postero-lateral angles; the soft rays are attached nearly to its tip, as can be made out by the torn membrane adhering to it; anterior angle of soft portion of fin evenly rounded, protruding slightly beyond the spine; posterior rays short, the last joined to the back by a low membrane connecting it with first ray of second dorsal; distance between base of last ray of first dorsal and origin of second dorsal equal to two-thirds the height of the first; first dorsal spine, when declined, reaches slightly beyond the origin of second dorsal; the soft portion of the first dorsal and the membrane joining it to the second are contained in a deep groove; length of spine contained 1.7 times in head; the second dorsal rises rapidly, reaching its greatest height opposite tips of pectorals, where it is about 0.2 the length of head, its margin entire, nonsinuate throughout; notch between second dorsal and "caudal" deep, but not to base of fin; no distinct anal fin, the fin on lower side of tail regularly diminishing in height anteriorly, and without notch; pectoral not falcate, extending well beyond base of ventrals, and longer than head; ventrals contained 1.6 times in length of head; tail broken at a distance of 18 cm. behind end of second dorsal, very slender at that point, and probably not produced to form a filament.

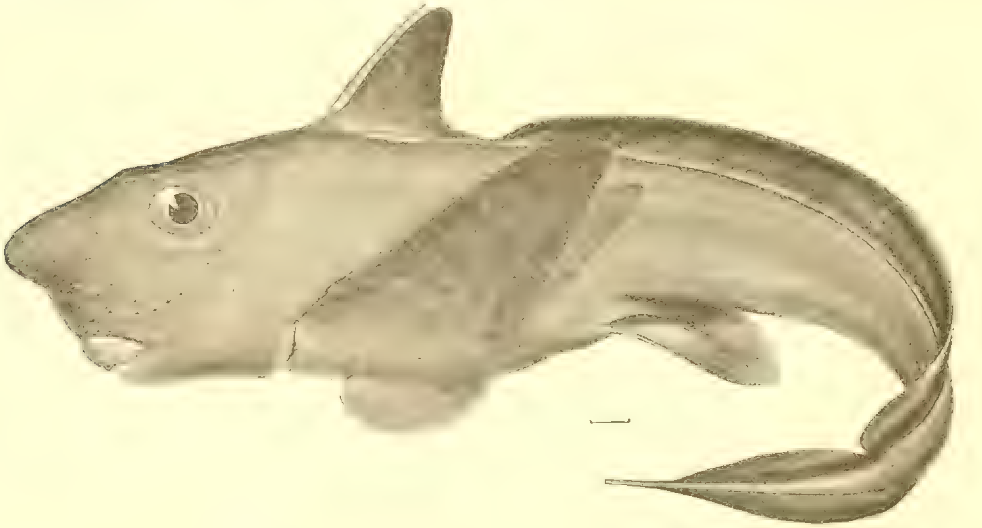


FIG. 231.—*Chimæra purpurescens* Gilbert, new species. Type.

Color uniform purplish or plum color throughout.

Only the type is known from Hawaiian waters, but a large specimen from Japan has recently been identified with this species by Prof. J. O. Snyder.

Family SYNAPHOBRANCHIDÆ.

Synaphobranchus brachysomus, new species. Fig. 232.

Type, 71 cm. long, from station 4019, vicinity of Kauai, depth 409 to 550 fathoms; type, No. 51591, U. S. Nat. Mus.

Length of head from tip of snout to front of gill-slit 13 hundredths of total length; greatest depth of body 10; distance from tip of snout to front of dorsal 30; distance from tip of snout to front of anal 28; to upper axil of pectoral 14; distance from tip of snout to upper axil of pectoral exceeding the distance from the latter to front of anal; dorsal beginning but little behind vent, everywhere lower than anal. Length of snout 36 hundredths of length of head; length of buccal cleft 65; diameter of eye 14; interorbital width opposite middle of eyes 22; depth of snout at front of orbit 28; greatest width of head 39; width of gill-slit 21; length of pectoral 53.

Head slender, flattened above, its upper profile evenly curved, nuchal region not gibbous; snout ending in a fleshy tip extending well beyond front of vomer and slightly beyond mandibular tip; front of vomer about opposite anterior nostril; posterior nostril a round pore with margins very slightly raised; anterior nostril a short tube directed forward; distance from posterior nostril to eye equaling one-third the interval between nostrils; mandibular teeth minute posteriorly, in a narrow band which narrows anteriorly to a single series of slightly enlarged teeth; maxillary teeth similar, in a wider band, which narrows anteriorly, but not to a single series, the inner row of teeth becoming anteriorly somewhat larger than the others; a prominent elliptical patch of teeth on head of vomer, those on median line a little larger than any other teeth in mouth; a single series of small conical teeth along shaft of vomer.

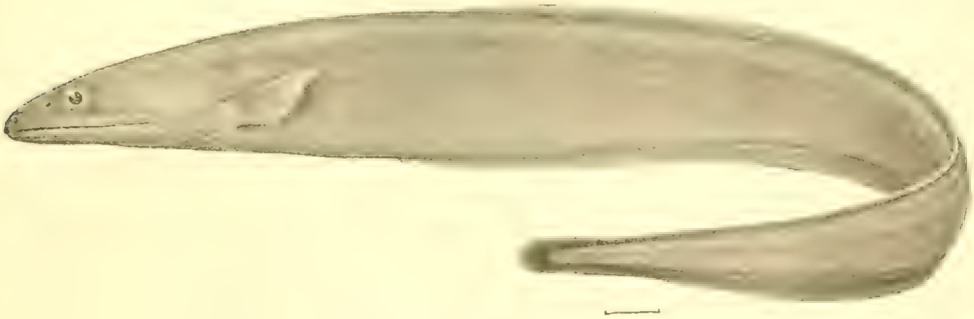


FIG. 2 —*Synaphobranchus brachysomus* Gilbert, new species. Type.

Scales narrowly elliptical, arranged in groups with their axes at right angles to each other, absent on fins, snout, and under side of head; lateral line prominent, opening by small pores arranged principally along its lower margin, each pore with raised margins; lateral line nearer the dorsal than the ventral outline, until it approaches within less than a head's length of the tip of tail.

Color, warm brown, darker on fins and under side of head; fins all distinctly white-margined; buccal and gill-cavities, and body cavity lined with blackish membrane.

In the 2 smallest specimens, 19 and 36 cm. long, the body and fins are much lighter in color, the fins almost perfectly translucent in the smallest. In both, the caudal and the posterior part of dorsal and anal are jet-black, without white edging. The origin of the dorsal varies somewhat in position, but is a little in advance of the anal in only one specimen.

Most nearly related to *S. pinnatus* (Gronow) and *S. affinis* Günther, differing in the much shorter trunk, and in the white margins of the fins. Examples were taken at the following stations: Nos. 3979, vicinity of Bird Island, 222 to 387 fathoms; 4019, vicinity of Kauai, 409 to 550 fathoms; 4123, off the southwest coast of Oahu, 352 to 357 fathoms; 4137, off the southwest coast of Oahu, 411 to 476 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms.

Family LEPTOCEPHALIDÆ.

Leptocephalus æquoreus (Gilbert & Cramer).

It seems at present impossible to recognize *Congrellus* as distinct from *Leptocephalus*. The position of the front of the dorsal, whether over the basal portion or the distal portion of the pectoral fin, can not be considered a useful generic character. The species which have been included in *Congrellus* are supposed to live in somewhat deeper water and to have the system of sensory canals more largely developed, but the species differ widely in this respect also. It is best to unite these genera until a review of all the species has discovered some basis for separation.

In the original description of *L. æquorea*, the snout is said to be contained 3 to 3.25 times in the head. This should read 3.5 in adults, 3.7 or 3.8 in young. The projection of the soft tip of the snout is variable; it usually extends beyond the mandible for a distance less than two-thirds diameter of eye; the longitudinal diameter of eye is contained 6.3 times in the head; the teeth on the head of the vomer form a broad transverse patch, the outer posterior tooth on each side sometimes a little enlarged; those on the shaft of the vomer are separated from the anterior teeth by a short interspace, and are in a short narrow patch, the central tooth enlarged, canine-like, and sometimes preceded or followed by 1 or 2 smaller canines on the median line; the maxillary and mandibular teeth are similar, all slender and sharp, arranged in bands, within which no rows are visible; at the angle of the mouth the teeth are very small, those in the outer portion of the band becoming larger anteriorly. A single short and thick pyloric cæcum.

The species was taken at the following stations: Nos. 3813, off the south coast of Oahu, 183 to 264 fathoms; 3984, vicinity of Kauai, 164 to 237 fathoms; 3988, vicinity of Kauai, 165 to 469 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4123, off the southwest coast of Oahu, 352 to 357 fathoms; 4136, vicinity of Kauai, 294 to 352 fathoms.

Congermuræna æquorea Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 405, pl. XXXVII.

Promyllantor alcocki Gilbert & Cramer.

Not abundant; taken at 7 stations, ranging in depth from 238 to 334 fathoms. This range embraces that of the type specimens, collected in 1891 at a depth of 295 fathoms.

The genus *Promyllantor* differs from *Leptocephalus* in the position of the nostrils, and in the dentition. The posterior nostril is above the anterior part of the eye; the anterior is on the inferior surface of the projecting snout. The teeth are all villiform, in very broad bands. In *P. purpureus* Alcock, the type and only other species of the genus, the teeth are described as occurring "in broad bands in the jaws, and in a broad confluent triangular patch covering the palate." From this description, Goode and Bean (Oceanic Ichthyology 1896, p. 138) have inferred that the genus lacks vomerine teeth. In *P. alcocki*, the roof of the mouth is largely covered by a broad patch of villiform teeth, which are placed on the shaft of the vomer and are continuous with the narrower band on the head of the vomer. The latter does not project beyond the broad maxillary bands, which are continuous with it laterally. It is very probable that Alcock's description of *P. purpureus*, quoted above, refers to a condition similar to that found in *P. alcocki*. The teeth are narrowly conical, but not acutely pointed, those on the posterior portion of the vomer blunter than the others. There is no pyloric cæcum. The soft tip of the snout is much longer in some specimens than in others, sometimes scarcely protruding beyond the jaws. *Congrosoma* Garman (Mem. Mus. Comp. Zool., XXIV, 1899, p. 308), seems to differ from *Promyllantor* only in the position of the posterior nostril, which is in advance of the eye.

Examples were taken at the following stations: Nos. 3836, off the south coast of Molokai, 238 to 255 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3900, Pailolo Channel, 280 to 283 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 4090, Pailolo Channel, 304 to 308 fathoms.

Promyllantor alcocki Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 405, pl. XXXVI, fig. 1.

Family NETTASTOMIDÆ.

Metopomycter, new genus.

Like *Nettastoma* in all respects, except the position and shape of the posterior nasal openings, which are long slits, beginning above the middle of the eyes and extending backward, converging toward the middle line. The genus includes the type species and *Nettastoma parviceps* Günther. In the type of *Nettastoma*, *N. melanurum*, the posterior nostril is located in front of the eye, on a level with its upper margin.

Metopomycter Gilbert, new genus of *Nettastomidæ* (*denticulatus*).

Metopomycter denticulatus, new species. Fig. 233.

Type, 778 mm. long, from station 4019, vicinity of Kauai, depth 409 to 550 fathoms; type, No. 52191, U. S. Nat. Mus.

Length of head and body 38 hundredths of the total. Length of head 34 hundredths of total length without tail; snout 13; eye 3; interorbital width 3; preoral length of vomer 1; tip of vomer to angle of mouth 17; tip of vomer to front of posterior nostril 15; length of gill-slit 2.5; distance between gill-slits 3.8; greatest depth of head 8; greatest width of head 7; distance from occiput to front of dorsal 9.

Head and body slender; tail tapering posteriorly, but ending squarely at base of caudal; snout depressed, flattened above, its depth everywhere equaling or slightly exceeding its width; vomer protruding beyond mandible a distance equaling one-third the diameter of eye; soft tip of snout scarcely projecting beyond vomer; anterior nostril, on upper aspect of snout near its tip, a large round opening, directed forward, each in a very short tube; posterior nostril a long slit beginning above middle of eye, the two converging backward; sides of snout very soft, thickly beset with minute pores, a few larger pores in pairs on top of snout; diameter of eye equal to interorbital width; teeth very small, in wide bands, forming a shagreen-like surface, the inner series slightly larger, but still very small; band on vomer extending five-sixths the length of buccal cleft; maxillary extending beyond the eye a distance slightly exceeding half its diameter; tongue absent.

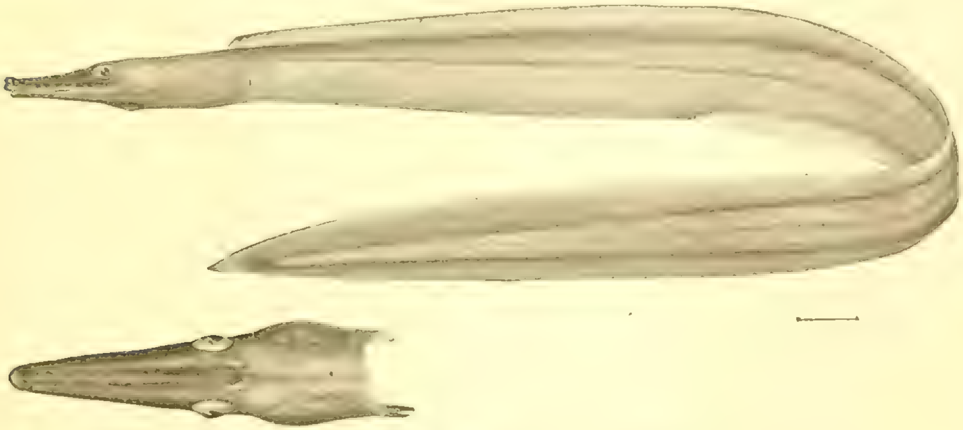


FIG. 233.—*Metopomycter denticulatus* Gilbert, new species. Type.

Dorsal fin beginning two-thirds diameter of eye in advance of gill-opening.

General color olive-brown, growing darker toward tip of tail, and on head; snout, mandible, opercles, and area surrounding the vent, blue-black; a bluish tinge on abdomen and along base of anal fin; vertical fins translucent anteriorly with a light bluish tinge, becoming blue-black posteriorly with a white edge; abdominal cavity lined with blackish.

The type only is known. The species differs from *M. parviceps*, from the Japanese region, in its larger head and different color. It has much smaller teeth than *Nettastoma melanurum*.

Garialiceps tæniola Wood-Mason, from the Bay of Bengal, has been subsequently referred by Alcock to the genus *Nettastoma*. But as the posterior nostril is "situated laterally nearly midway between the eye and the tip of the snout," the gill-openings are "of moderate size, almost meeting in the mid-ventral line;" there is present a fleshy tongue, and the mandible and vomer are abruptly expanded at tip, the species would seem to belong to a genus distinct from *Nettastoma*, for which the name *Garialiceps* must be retained. *Garialiceps* Wood-Mason, first appears in a paper by Alcock "On the Bathybial Fishes of the Bay of Bengal" in Ann. Mag. Nat. Hist. (6) vol. 4, 1889, p. 460. Two species are described: *G. tæniola* Wood-Mason and *G. microps* Alcock. There can be no doubt that *G. tæniola* must be considered the type of the genus, and this would become a synonym of *Nettastoma* if Alcock's later views are correct, and the characters indicated above are not of sufficient importance to warrant generic separation. The immature types of *G. tæniola* are said to have no pectoral fins. In later papers, in describing the adults of *G. tæniola*, Alcock neglects to call attention to the presence of pectoral fins, though their presence would be inferred from his reference of the species to *Nettastoma*. If they were absent in the types of the species, but were present in the adult specimens subsequently acquired, an error must have been made in the identification of the adults, as pectorals are present even in the larval stages of eels which possess pectorals in the adult condition.

For the nemichthyoid genus, without pectoral fins, typified by *Garialiceps microps*, to which Alcock erroneously restricts the genus *Garialiceps*, I would propose the name *Alcockidia*, in honor of its distinguished discoverer.

Family NEMICHTHYIDÆ.

Serrivomer beanii Gill & Ryder.

Three specimens were obtained, which I am unable to distinguish from Garman's figure and description of *S. sector* from the Pacific coast of Mexico and Central America. Garman fails to point out any characters by which *S. sector* differs from *S. beanii* of the Atlantic. *S. beanii* has received no description beyond a few trivial remarks, but the figure of the type presented by Goode and Bean (Oceanic Ichthyology, 1896, fig. 175) agrees so closely with the Pacific form that I do not venture to separate them. Differences may appear when it is possible to compare material from the various localities.

The specimens were taken at the following stations: 3910, off the south coast of Oahu, 311 to 337 fathoms; 4157, vicinity of Bird Island, 762 to 1,000 fathoms; 4183, vicinity of Kauai, 957 to 1,067 fathoms.

Stemonidium, new genus.

Intermediate in some respects between the groups typified by *Nemichthys* and *Serrivomer*, having the dentition of the former, and the short straight jaws, small eyes, long postorbital region, and wide, partly confluent gill-openings of the latter; it agrees with *Serrivomer* also in the position of the nostrils and the absence of the lateral line pores. The pectorals are reduced in size, with few rays, and are very slender. The dorsal originates behind the occiput a distance equal to half the length of the head, and the vent is remote from the head. Not closely related to any known genus, but nearer *Serrivomer* than *Nemichthys*, in spite of its reduced dentition.

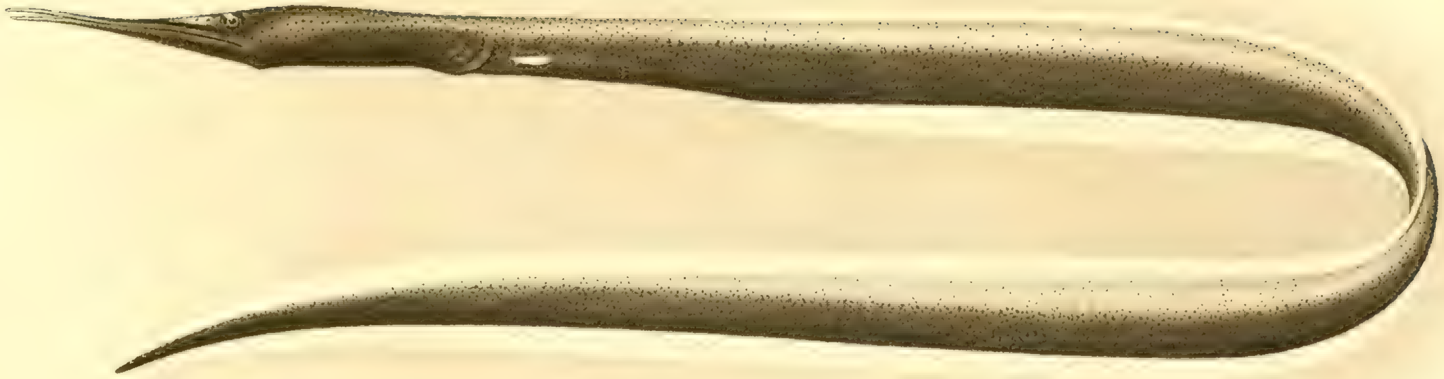
Stemonidium Gilbert, new genus of *Nemichthyidæ* (*hypomelas*).

Stemonidium hypomelas, new species. Plate 67.

Type, 171 mm. long, from station 4176, vicinity of Niihau Island, depth 537 to 672 fathoms; type, No. 51550, U. S. Nat. Mus.

Head 17 hundredths of the total length; distance from tip of snout to front of anal 26; from tip of snout to front of dorsal 25; from tip of snout to front of eye 8; diameter of eye 1; length of pectoral 1.5; greatest depth of body 3; interorbital width two-thirds diameter of eye.

Body narrowly band-shaped, of nearly uniform depth in its middle half, tapering to the narrower neck, and rather rapidly to the pointed but short and not filamentous tail; eye very small, in the middle of length of head, one-eighth the postorbital length of head, a little longer than interorbital width; head and beak shaped much as in *Serrivomer;* upper profile descending in a straight line from occiput



STEMONIDIUM HYPOMELAS GILBERT. TYPE.

to the basal half of the rostrum, which is more robust than in *Nemichthys*, and wholly lacks the characteristic snipe-like aspect of the latter; jaws tapering to very delicate slender tips, and closely apposed for their entire length; lower jaw slightly longer than upper; gape extending to below posterior border of eye; maxillaries terminating anteriorly at a point midway between tip of snout and front of eye, the anterior half of beak composed of the elongate vomer alone; teeth as in *Nemichthys*, all reduced to small granular plates, arranged in quincunx on the jaws and vomer, each ending in a short acute tip directed posteriorly; vomerine band wide posteriorly, then tapering to a point opposite the nostrils; maxillary and mandibular bands narrower than in *Nemichthys*, none of upper band and only a narrow strip of the lower inserted on the lateral aspect of the jaw; nostrils as in *Serrivomer*, consisting of 2 short slits, in front of the middle of eye, the anterior shorter than the posterior; gill-slits long, very oblique, confluent below, the membranes united inferiorly and free from the isthmus; gills 4. As in *Serrivomer*, no lateral line can be detected.

Dorsal and anal beginning at nearly the same vertical, which is half the length of head behind gill-opening; anterior dorsal rays extremely delicate and difficult to detect, none shortened or spine-like; anal somewhat higher than dorsal, the rays longer and more crowded in the posterior portions of both fins.

Upper half of body light grayish, covered with fine black pigment specks; the lower half of side abruptly jet-black; head all black save tips of jaws and the occiput, which are a little lighter; posterior sixth of tail wholly black; all the fins light-colored.

A single specimen known.

Nematoprora, new genus.

Like *Nemichthys*, but without pores along the lateral line, and with pavement-like teeth which do not bear backwardly-directed spinous tips, like those present in *Nemichthys* and related genera.

Tail ending in a long filament; dorsal beginning on nape and without differentiated spinous portion; anal origin immediately behind tips of pectorals; jaws exceedingly attenuate, recurved; the nostrils are round pores, the posterior behind and above the anterior; branchial membranes are torn anteriorly in the type specimen, but the branchial clefts were apparently wide.

Nematoprora Gilbert, new genus of *Nemichthyidæ* (*polygonifera*).

Nematoprora polygonifera, new species. Fig. 234.

Type, 315 mm. long, from station 4151, vicinity of Bird Island, depth 313 to 800 fathoms; No. 51589, U. S. Nat. Mus.

Head 7.5 hundredths of total length; greatest depth 2.2; least depth at nape 1; distance from tip of snout to front of dorsal 7; from tip of snout to vent 8.5; length of snout 5.5.

Greatest depth of body near middle of its total length; contours not approximately parallel for a considerable portion of its length as in *Nemichthys*, but converging gradually to the filiform tail, and forward to the very narrow "neck;" head extremely slender, little deeper than the neck, about three-fifths the greatest depth of body; eye small, in the posterior two-sevenths of head, its diameter twice the width of the flat interorbital space, a little more than one-third the postorbital length of head; upper jaw a little longer than the lower, with no indication of mutilation; teeth pavement-like, with slightly rounded surfaces, and arranged in oblique series.

FIG. 231.—*Nematoprora polygonifera* Gilbert, new species. Type.

Dorsal rays extremely delicate, the anterior very short and slender throughout, the median and posterior rays longer, with a thicker base and a very attenuate tip. In a poorly preserved specimen, the delicate tips of the rays would be easily detached and the short stiff bases might then appear as a series of differentiated spines. It is certain that this occurrence has been responsible for the ascription of spines to at least one species of *Nemichthys* (*N. avocetta*). This may also be the case in *N. acanthonotus* Alcock and *N. fronto* Garman. The dorsal originates at a point midway between the occiput and the vertical from the base of the pectorals. The pectoral fins are short and broad. The course of the lateral line is definitely marked, but no pores are visible under high magnification.

Upper half of body whitish, unmarked, lower half covered with thickly crowded polygonal spots of blackish, about as large as the pupil; most of these are pentagonal or squarish in outline, and each consists of a whitish center, from which radiate very numerous fine black hair-lines; a single series of these spots runs along the entire upper margin of the lateral line, which is whitish, of the color of the back, and very conspicuous; the abdomen and lower side of tail posteriorly develop additional black pigment and are much darker; lower half of head, including basal portion of mandibles, irregularly blotched or spotted with blackish.

But one specimen known, probably from much nearer the surface than the depth of the dredge-haul would indicate.

Family OPHICHTHYIDÆ.

Sphagebranchus flavicaudus Snyder.

Taken at the following stations: No. 3874, channel between Maui and Lanai, in 21 to 28 fathoms; 4055, off the northeast coast of Hawaii, 50 to 62 fathoms; 4061, off the northeast coast of Hawaii, 24 to 83 fathoms.

Family MURÆNIDÆ.

Uropterygius marmoratus (Lacépède).

Taken at the following stations: No. 3847, off the south coast of Molokai, in 23 to 24 fathoms; 3850, off the south coast of Molokai, in 43 to 66 fathoms; 3872, channel between Maui and Lanai, in 32 to 43 fathoms; 3876, channel between Maui and Lanai, in 28 to 43 fathoms.

Gymnothorax undulatus (Lacépède) and *Melichthys radula* Solander have been listed by Snyder (Bull. U. S. Fish Comm., 1902, 518) from station 3824, off the south coast of Molokai, at a depth of 222 to 498 fathoms. These are both common reef-forms and were not taken at the station given, but probably from 3874, tangles, 21 to 28 fathoms, between Maui and Lanai.

Uropterygius leucurus Snyder.

Taken at station 3874, channel between Maui and Lanai, 21 to 28 fathoms.

Family SYNODONTIDÆ.

Synodus varius (Lacépède).

This common shore form was dredged at the following stations: Nos. 3849, off the south coast of Molokai, 43 to 73 fathoms; 3850, off the south coast of Molokai, 43 to 66 fathoms; 3875, Avau Channel, 34 to 65 fathoms; 4158, vicinity Bird Island, 20 to 30 fathoms.

Synodus kaianus (Günther).

Nine specimens were secured of a species of *Synodus*, which we are unable to distinguish from *S. kaianus* Günther, known only from Günther's figure and brief description, cited below.

Head 3.3 to 3.7 in length (without caudal), depth about 7. Length of snout 7 to 8 hundredths of total length without caudal; diameter of eye 6.5 to 7; length of maxillary 17 to 18; length of pectoral 15; length of ventrals 20 to 21; distance from tip of snout to front of dorsal 42 to 44; from front of dorsal to adipose dorsal 42 to 44; from front of adipose dorsal to middle of caudal base 16 to 17; from base of ventrals to front of anal 44. D. rays 10 to 13; A. 10 to 11; P. 12; V. 8; branchiostegal rays 11 or 12; scales in the lateral line 61-64; 17 or 18 scales in the median series from occiput to front of dorsal.

Our specimens have a very slender form, and a narrow slightly upturned snout, which protrudes beyond the tip of the mandible, though to a less extent than is indicated in the figure of the type; maxillary reaching to or beyond middle of cheek; the narrow tip of the mandible soft and flexible, fitting behind the premaxillary teeth; teeth slender and showing the usual arrangement; an inner longer series and an outer shorter series of teeth in the jaws and on the palatines, both depressible; tongue and basibranchials covered with large teeth, which, in the closed mouth, occupy the medial depression between the palatines; eye surrounded by a narrow but heavy adipose ring, of very irregular contour, containing a small sharp notch above the middle of the posterior side, and an abrupt notch and angle postero-inferiorly; the superior margin deeply incised; position and proportions of fins as represented in the figure of the type cited below.

Color, lower half of side bright silvery, marked with alternately wide and narrow cross-bars. In some specimens still narrower bars divide the intervals between the primary and secondary bars. Dorsal fin translucent, the rays occasionally with dusky cross-bars.

Taken at the following stations: Nos. 4079, off the north coast of Maui, 143 to 178 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4104, Pailolo Channel, 123 to 141 fathoms.

Saurus kaianus Günther, Shore Fishes, Challenger, 1880, 50, pl. XXIII, fig. C. Ki Islands; in 129 fathoms.

Saurida gracilis (Quoy & Gaimard).

Taken at station 4068, off the north coast of Maui, 14 to 18 fathoms.

Trachinocephalus myops (Forster).

Taken at the following stations: Nos. 3850, off the south coast of Molokai, 43 to 66 fathoms; 4067, off the north coast of Maui, 10 to 14 fathoms.

Family AULOPIDÆ

Chlorophthalmus proridens Gilbert & Cramer.

In the light of our abundant material the following notes are added to the original account of the species:

Distance from tip of snout to tip of ventrals 2.4 in length of head and body; base of anal 4.3 to 4.5 in head. Pectorals extending well behind vent, 1.2 in head; ventrals shorter than in the type, 1.7 to 1.8 in head; anal with 9 rays, the last ray cleft to base; body as wide as deep immediately in front of pectoral fin, much narrower than deep at all points posterior to this; head wider than deep immediately behind eyes. Maxillary gradually widened behind (not "abruptly expanded"); with a narrow rod-shaped supernumerary bone, movably attached by membrane, along the distal two-thirds of its posterior edge. Sides of mandible with a narrow band (about 2 series) of small teeth, those of the inner series larger than the others; the symphyseal continuation of this band consists of a single series of somewhat larger teeth, directed almost horizontally backward; in front of this series, occupying the upper surface of the protruding symphyseal knob, are 2 series of teeth, laterally in contact, separated mesially by a wide space; the anterior series consisting of strong conical teeth, directed horizontally forward, the inner series much smaller, directed posteriorly; premaxillary witn a narrow band of teeth occupying its entire length; head of vomer with a projecting lobe on each side, each lobe with a single series of 5 or 6 strong teeth; palatines with a single series occupying the anterior three-fifths of their length, the series abruptly widening at anterior end to form a knob; a few minute teeth scattered over surface of tongue can be made out with difficulty; vertical limb of anterior branchial arch adnate to gill-cover by a fold of membrane, as in *Macrourus*.

Scales strongly ctenoid on back and sides (not cycloid, as described); cycloid on breast, belly, and under side of tail; opercles completely scaled; a few of the scales on cheeks and opercles with short spinous points.

Color grayish silvery, the upper parts coarsely black-punctate; a narrow blackish vertebral streak; margins of snout and of mandible blackish; a dusky patch on cheeks, below eye; interorbitals and occiput blackish, the opercles black; anterior 2 or 3 dorsal rays black on basal third; a blackish bar encircling body below dorsal fin, expanding below to include the breast, and becoming intensely black about base of ventrals; inner 3 or 4 ventral rays intensely black; upper half of axil dusky; a blackish streak at base of caudal, including the upper rudimentary rays; gullet, gill cavity and peritoneum black.

Taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3900, Pailolo Channel, 283 to 280 fathoms; 3920, off south coast of Oahu Island, 280 to 265 fathoms; 3952, vicinity of Laysan Island, 351 to 347 fathoms; 4081, off north coast of Maui Island, 202 to 220 fathoms; 4082, off north coast of Maui Island, 220 to 238 fathoms; 4096, Pailolo Channel, 272 to 286 fathoms; 4115, off northwest coast of Oahu Island, 195 to 241 fathoms; 4117, off northwest coast of Oahu Island, 282 to 253 fathoms; 4122, off southwest coast of Oahu Island, 192 to 352 fathoms; 4132, vicinity of Kauai Island, 257 to 312 fathoms.

Chlorophthalmus providens Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 406, pl. 36, fig. 2.

Family BATHYPTEROIDÆ.

Bathypterois antennatus, new species. Fig. 235.

Type, 165 mm. long, from station 4151, vicinity of Bird Island, depth 313 to 800 fathoms; No. 5160, U. S. Nat. Mus.

Head 22 hundredths of total length without caudal; depth 14; depth of caudal peduncle 7.5; interorbital width 7.5; eye 2; snout 7; maxillary 14; length of ventrals 33; length of pectoral filament 100; D. 15; A. 9; P. 2–10 or 11; V. 9; branchiostegals 13 or 14; scales 5–56 or 57–8.

Anterior nostril midway between tip of snout and middle of eye, the 2 nostrils separated only by the elevated membranous rim of anterior nostrils; posterior nostril elliptical in shape, twice the diameter of the anterior; eye minute; maxillary comparatively broad, its greatest width approximately equaling the length of the tapering posterior portion; teeth minute, in a narrow band on premaxillaries and a wider band in the mandibles, the premaxillary band confined to anterior half or three-fifths of the bone; a few minute asperities in a patch on each side of the head of the vomer and on the front of each palatine; gill-rakers very long, slender, toothed, 14+34 on the outer arch.

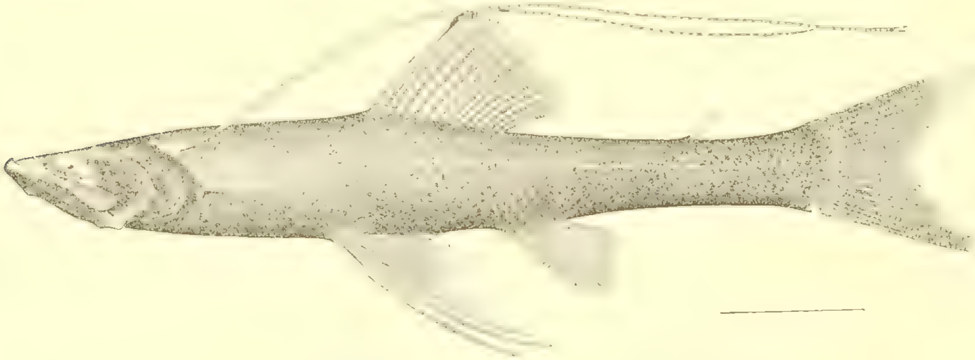


FIG. 235.—*Bathypterois antennatus* Gilbert, new species. Type.

Origin of dorsal midway between tip of mandible and middle of interspace from adipose dorsal to caudal, or a short distance behind axil of ventral, its base very slightly overlapping front of anal and its length 1.5 in head; about one-fourth of dorsal fin in the anterior half of body; distance from adipose fin to base of upper caudal rays one-third its distance from origin of dorsal, or two-thirds its distance from last dorsal ray; origin of anal midway between head and base of caudal fin; lower caudal lobe longer than the upper, 3.4 in total length without caudal; upper pectoral ray injured in both our specimens, but extending beyond caudal; it is forked as far forward as a point between vent and front of anal, and the coalesced halves of the ray can be traced to the base; second ray joined to first by membrane, and very short, about 0.2 length of head; below this 10 or 11 very slender disconnected rays, some of the lower ones at least forked near tip, and extending beyond origin of anal fin; the 2 outer ventral rays wholly distinct, simple, elongated and flattened, and with a soft white pad near their tips; in the type they extend well beyond the anal base; in the cotype, to the base of the last ray; third ventral ray divided, its outer half produced and modified much as in the outer rays; distance from vent to anal fin 1.7 in distance from insertion of ventrals.

Color brownish black, the pectoral filaments and tips of outer ventral rays white; mouth and gill-cavities and the peritoneum blackish.

The cotype is 200 mm. long, and was taken at station 4181, vicinity of Kauai, depth 1,000 to 1,314 fathoms.

Family MYCTOPHIDÆ.

Nannobrachium nigrum Günther.

Three small specimens in rather poor condition, having lost much of the integument, agree closely with Günther's description and figure. Dorsal 14; anal 16 or 17; gill-rakers 18 on outer arch; eye somewhat larger in our specimens, a trifle less than 5 rather than 4 in head, longer than snout, and exceeding also the longest gill-raker. While we do not venture to distinguish the Hawaiian form on the basis of the larger eye, there may exist other characters not given by Günther. The number and distribution of the luminous spots in the type of *N. nigrum* remain wholly unknown. In the Hawaiian specimens these are arranged as follows: Mandibulars, 3 pairs, very inconspicuous; operculars, but 1 pair evident, poorly developed; pectorals, 4 pairs, 1 immediately below lateral line, 1 on pectoral base, 1 vertically below pectoral base and halfway to median line, 1 on line between pectoral base and first thoracic pair; thoracics, 5 pairs, the fourth pair high up on sides, over interspace between third and fifth pairs, the lower pairs evenly spaced; supraventrals, 1 pair, immediately below lateral line; ventrals, 4 pairs, evenly spaced; supra-anals, 3 pairs, 2 forming an oblique line upward and backward from vent, the uppermost on the lateral line, the third well forward, over the interspace between second and third ventrals, on a level with the fourth pair of thoracics; anals in 2 well-separated series, the anterior group with 6 pairs, of which the first 5 are in parallel lines, the sixth placed high, in a line joining the fifth anal and the posterolateral; posterior series also with 6 pairs; posterolaterals, 1 pair, on the lateral line; caudals 4, the anterior 3 forming a right-angled or obtuse-angled triangle at base of lower lobe, the fourth separated from the third by a wide interspace, placed on, or even a little above, the end of the lateral line; a luminous streak above and one below on caudal peduncle.

In size and position of fins and in the arrangement of the photophores *N. nigrum* shows great resemblance to the type of *Lampanyctus*, *L. crocodilus* (Risso). The 2 genera are distinguished only by the reduction of the pectorals in *Nannobrachium*, a character of doubtful value. The pectorals are narrow in our specimens, and consist of a few (3 to 6) short rays. The body is uniformly black, the fins black on basal portions.

The species was taken at the following stations: No. 4108, Kaiwi Channel, 411 to 442 fathoms; 4110, Kaiwi Channel, 449 to 460 fathoms. The type of *N. nigrum* was taken south of the Philippine Islands, at a depth of 500 fathoms.

Nannobrachium nigrum Günther, Deep-sea Fishes, Challenger, 1887, 199, pl. 52, fig. B, south of the Philippines.

KEY TO HAWAIIAN SPECIES OF DIAPHUS.

a. No luminous areas about eye .... *urolampus*, p. 591
aa. Luminous area covering entire snout .... *chrysorhynchus*, p. 592
aaa. A narrow luminous streak above eye and one below it .... *adenomus*, p. 592

Diaphus urolampus Gilbert & Cramer.

One specimen from station 4016, vicinity of Kauai Island, depth 305 to 318 fathoms. The types were from 295 and 310 fathoms.

The species has the following characteristic disposition of the photophores: Upper pectorals immediately below lateral line, the supraventrals, upper supra-anals, and posterolaterals in contact with the lateral line; the fourth thoracics high on sides, on a level with pectoral base; second and third ventrals elevated, on the same level, a little above ventral base; supra-anals 2, forming a slightly oblique line which traverses the fifth ventrals; first anal (interpreted as one of the supra-anals in the description cited below) elevated, nearly vertically above the second; the second to sixth anals forming a line parallel with base of anal fin, the seventh elevated, on a line joining sixth with posterolateral; 6 posterior anals. The distinguishing features are especially the elevated second ventral, the presence of but 2 (instead of 3) supra-anals, and the very high position of the uppermost series.

The differentiation of the upper half of each photophore and its superficial separation from the lower half by a pigment band can be made out only when the photophores are uninjured and are still protected by the scales. It is possible that all species heretofore grouped in *Collettia* and *Æthoprora* possess the character of divided photophore. In this case we should range them under the oldest name, *Diaphus*, as we do not consider the presence or the extent of the preocular photophore of generic importance. If the current system of minute subdivision be followed to its logical extreme, *D. urolampus* must be considered the type of a new genus, distinguished by the absence of preocular photophores, and *D. chrysorhynchus* the type of another characterized by the large preocular photophore, which covers the entire snout (as in *Æthoprora*).

Diaphus urolampus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, p. 408, pl. 38, fig. 1.

Diaphus chrysorhynchus Gilbert & Cramer.

Four specimens were taken at the following stations: No. 3834, off Kaunakakai, Molokai, surface; 3921, off Honolulu, surface; 4117, off northwest coast Oahu, 253 to 282 fathoms.

The specimen from station 4117 came to hand in perfect condition and must have entered the trawl near the surface. All other specimens known, including type and cotypes, were obtained in the surface tow net.

The bluntly rounded snout, covered by the preocular photophore, gives a strong resemblance to the species of *Æthoprora*, which differ only in their simple photophores. It is not improbable that perfect specimens of *Æthoprora* and *Collettia*, with scales still in place, will show their photophores also to be divided by a black pigment line, in which case the species may be united under the oldest name, *Diaphus*. *Nyctophus*, Cocco, used by Brauer for this group, was proposed solely as an amended form of *Myctophum*, and is therefore not available.

The photophores of *D. chrysorhynchus* show the following characteristic arrangement: Two lower pectorals on each side forming diverging lines extending from first thoracics to middle of pectoral base, third pectorals high on sides, nearer lateral line than pectoral fins; fourth thoracics elevated, on a level with ventral base, vertically over the third thoracics; five ventrals, the first, second, and third pairs forming oblique diverging lines, the third a little above level of ventral base; supra-anals 3, forming a nearly vertical line from vent, the uppermost more widely spaced, and in contact with the lateral line; the first anal (interpreted as supra-anal in description cited below) elevated, in a line joining second anal and upper supra-anal; second to fifth anals in a straight or gently curved line, the sixth strongly diverging, in a line which includes the posterolateral; the posterolateral in contact with the lateral line; five anals in the posterior series.

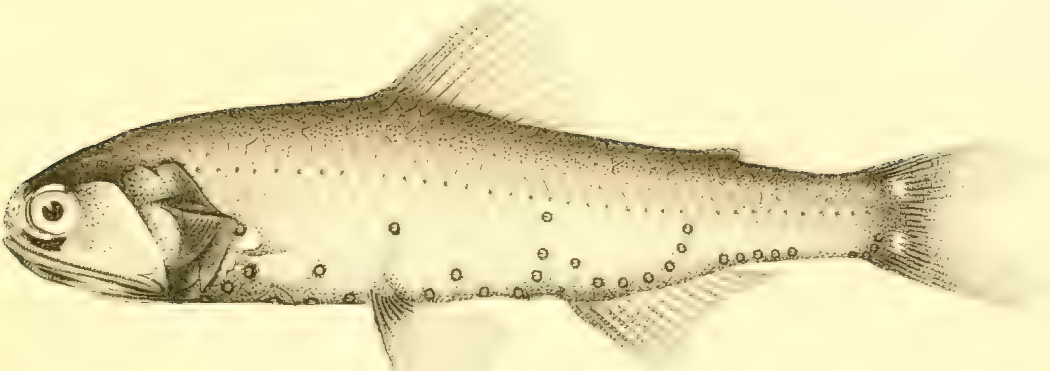
In the arrangement of its photophores this species agrees very closely with *D. theta* Eigenmann & Eigenmann and *D. adenomus*, but *theta* has the upper lateral spots much less elevated and the first anal on a level with the others, while *adenomus* has the upper pectoral much less elevated, and those of the anterior anal group describe a wide curve. *D. chrysorhynchus* shows no variation in the number or arrangement of its photophores (except that in one specimen there are on one side 6 instead of 5 posterior anals) nor in the size of its preocular luminous area.

Diaphus chrysorhynchus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 409, pl. 38, fig. 3 (not fig. 2, as erroneously indicated on the plate and in the description).

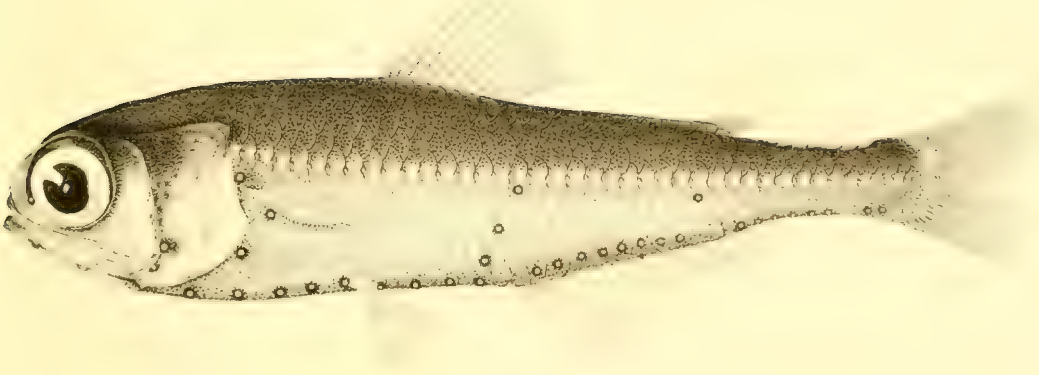
Diaphus adenomus, new species. Plate 68.

Type, a female with developed spawn, 16 cm. long, from Albatross station 4106, the Kaiwi Channel between Oahu and Molokai, depth 335 to 350 fathoms; type, No. 51588, U.S.Nat.Mus.

Head 28 hundredths of total length, excluding caudal; greatest depth of body 23; least depth of caudal peduncle 10; distance from last anal ray to first caudal ray 18, length of pectoral 10; length of inner ventral rays 17; base of anal 19; base of dorsal 21; diameter of eye 6; width of middle of interorbital space 8.5; length of snout 4.5; length of maxillary 20.5. D. 15; A. 15; P. 12; V. 9; scales in lateral line 36.



1. DIAPHUS ADENOMUS GILBERT. TYPE.



2. MYCTOPHUM MARGARITATUM GILBERT. TYPE.

Diameter of eye longer than snout, but shorter than interorbital width; maxillary very long and narrow, extending far behind middle of head, its posterior portion not at all widened; both premaxillary and mandible armed with broad bands of fine depressible teeth, which extend over the outer as well as the inner margins of the jaws; two small separate vomerine patches, one on each side of median line, a long narrow palatine band, and a longer broader pterygoid band, parallel to palatine band and extending farther backward; gill-rakers long and slender, 5+13 in number, toothed along their inner margins, the longest two-thirds the diameter of orbit.

Insertion of first dorsal and the outer ventral rays in the same vertical; base of last dorsal ray vertically above vent; front of adipose fin over last anal ray; pectoral reaching fourth thoracic photophore, the inner ventral rays barely reaching vent.

Scales caducous, all having fallen in the type. In one of the cotypes a few scales remain, which show that those of the lateral line are not enlarged, and that all have entire edges.

As in other species of *Diaphus*, the fourth thoracic photophore is elevated laterally to a point on a level with the base of the pectoral fin; the third ventral photophore is on the same level, the second ventral forming with the first and third an oblique line extending upward and backward; supraventral high, slightly nearer lateral line than base of ventral; supra-anals 3 in number, forming an oblique line from just before vent to lateral line, the upper supra-anal immediately below the lateral line, widely separated from second supra-anal; first anal remote from anal base, on a line joining second anal with upper supra-anal; second, third, and fourth anals lie near base of anal fin, the fifth and sixth diverging in a curved line which includes the single posterolateral; the latter is separated from the lateral line by one-fourth its distance from the anal base; five posterior anals in a straight line along anterior half of caudal peduncle; caudals 4 in number, equidistant in a curve at base of lower caudal lobe, the upper spot well below middle of caudal base; pectorals 3 in number, the upper at tip of opercular flap, the lower intermediate between the first thoracic and the spot at base of pectoral; a narrow luminous (golden) streak on upper orbital rim, and one along anterior half of lower margin, both of them conspicuously margined with black; no luminous patches on tail; a semicircular white glandular body between pectoral base and upper pectoral spot, similar to the one occupying the same position in *D. theta*. The division of the photophores can be made out only where they still lie protected beneath the scales.

General color dusky, the bases of all the fins except the pectoral black; anterior dorsal and anal fin blackish; opercle black, cheek silvery, snout whitish; interorbital space black, except a small whitish median area; a broad black subocular bar, from which a narrow black ring encircles anterior half of orbit; gular membrane black, its anterior portion violet; a black bar near tip of mandible, and one across mandible below eye; lining of buccal and gill-cavities and the peritoneum black.

The condition of all the specimens indicated that they entered the dredge near the bottom. They were taken at the following stations: No. 3920, off south coast of Oahu, 265 to 280 fathoms; 4015, vicinity of Kauai, 318 to 362 fathoms; 4106, Kaiwi Channel, 335 to 350 fathoms.

This species resembles *D. engraulis* Günther, from the Philippines, but differs in the darker coloration, the different shape of the circumocular luminous patches, and the higher position of the upper supra-anal and the posterolateral photophores.

Centrobranchus Fowler.

Allied to *Rhinoscopelus*, but without lateral line and with the gill-rakers obsolescent. The slender snout protrudes far beyond the premaxillaries, and is hollowed out on each side to form a conspicuous nasal cavity, which is entirely roofed over by the expanded preorbitals; these are strongly convex outwards and cover the entire lateral portions of the snout, joining superiorly and anteriorly the midrostral ridge, and in contact below with the premaxillaries; their posterior margin is notched to give passage to the nasal openings; gill-rakers reduced to a few rudiments near angle of arch; photophores arranged as in *Rhinoscopelus* and *Myctophum*, all those of the lower series forming parallel rows, none of them elevated on the sides, and the caudal photophores but 2 in number.

Centrobranchus Fowler, Proc. Ac. Nat. Sci. Phila., 1903 (Jan. 13, 1904), 754 (*chœrocephalus*).

Centrobranchus chœrocephalus[a] Fowler. Plate 69, Fig. 1.

Dorsal 11; anal 18; pectoral 13; ventral 8; scales in a longitudinal series 39; in a transverse series 10, excluding the median row above and below.

Greatest depth of body 20 hundredths of total length without caudal; least depth of caudal peduncle 4; length of head 26; diameter of orbit 7; interorbital width 8; length of snout 7.5; projection of snout beyond premaxillaries 4.5; length of maxillary 14; distance from tip of snout to front of dorsal 45, from front of dorsal to adipose dorsal 29, from front of adipose dorsal to rudimentary caudal rays 27, from tip of snout to ventrals 37, from tip of snout to origin of anal 53; base of anal 24; distance from last anal ray to base of median caudal ray 26; length of pectoral 12; length of ventral 10.

Body very slender, ventral outline a little more strongly curved than dorsal; behind the vent the form tapers rapidly to the very long and slender caudal peduncle; eyes small, the diameter a trifle shorter than length of snout; cleft of mouth strongly convex upward, extending well behind the orbits, and overpassed anteriorly by the strongly protruding conical snout; maxillary a very slender rod, not at all widened toward tip; premaxillary teeth in a single series; mandibular and palatine teeth in narrow bands; head of vomer with a pair of small round prominences covered with teeth; inside the palatine band is a shorter wider patch of teeth on each side median line of roof of mouth; preopercular margin entire, but little oblique; gill-rakers nearly obsolete, represented only by 2 to 4 small protuberances on each limb near the angle, each rudiment bearing minute spines.

The first dorsal ray is over the fourteenth scale of the mid-lateral series, and over the tips of the ventrals; base of ventrals vertically below the ninth scale of this series, first anal ray below the eighteenth; the pectorals fail to reach the middle of ventrals, and the ventrals do not reach the vent.

Scales thin, with entire edges, rather firmly adherent, those of the mid-lateral series larger than the others, but largely concealed anteriorly by the series above and below them; they bear no tubes; head entirely invested with scales, which cover mandibles and snout; 2 to 4 series of scales cover the basal half of the anterior portions of dorsal and anal fins.

Photophores arranged as follows: Preoculars 2, one at the upper, the other at the lower end of a narrow vertical pigment band on the anterior orbital rim, both minute, but the lower easily visible, the upper usually concealed beneath the protruding margin of the frontal in alcoholic specimens and made out only on dissection; mandibulars 3; operculars 2, the upper large, the lower minute and rudimentary beneath the preopercular margin, visible only on dissection; pectorals 3, the upper very slightly above and in front of the base of the upper pectoral ray, the middle immediately below base of lower ray, the lower concealed beneath the opercular margin, nearly midway between base of pectoral and the second thoracic photophore; thoracics 5, forming with their fellows 2 gently diverging series, the first, second, and third pairs usually a little more widely spaced than the others, the third and fourth pairs usually less widely spaced than the fourth and fifth; ventrals 4, evenly spaced, the lines parallel; anals 5+11, the break in the series over the middle of the anal fin; the second and third antero-anals often more widely spaced than the others; caudals 2, in a horizontal line immediately in front of the rudimentary caudal rays, more closely approximated than those forming the anal series; supraventrals 1, halfway between base of ventrals and middle of sides; supra-anals 3, forming a very oblique gently curved line, the upper encroaching on the mid-lateral row of scales and vertically above the vent, the middle one halfway between middle of sides and the fourth of the ventral series and slightly in front of the latter, the lowermost occupying a similar position with reference to the third of the ventral series, which it more closely approximates; posterolateral 1, over the break in the anal series and just below the mid-lateral line; the antero-anals vary from 4 to 7, in the following proportions, each side of each specimen separately enumerated: 4 in 2 cases, 5 in 64 cases, 6 in 68 cases, 7 in 8 cases; the postero-anals vary from 9 to 12: 9 in 15 cases, 10 in 84 cases, 11 in 42 cases, 12 on but one side of one specimen.

The combinations 5+10, 5+11, 5+12, 6+9, 6+10, 6+11, and 7+9 are found, those occurring most frequently being 6+10, 5+11, and 5+10, in the order named.

The sum of the anals varies from 14 to 17, as follows: 14 in 3 cases, 15 in 37 cases, 16 in 90 cases, 17 in 12 cases.

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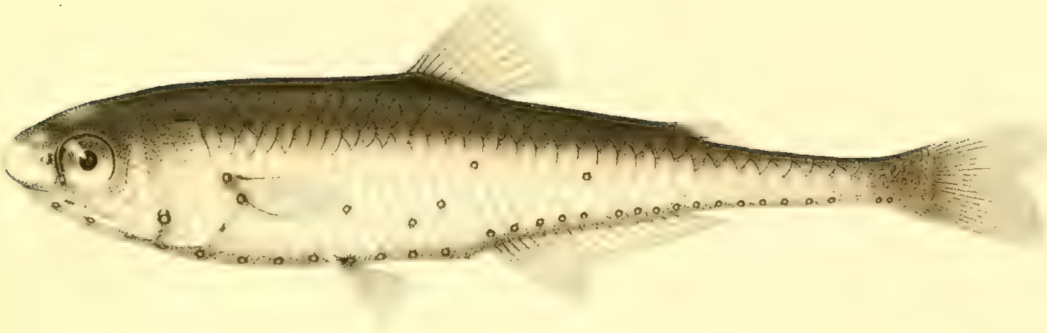
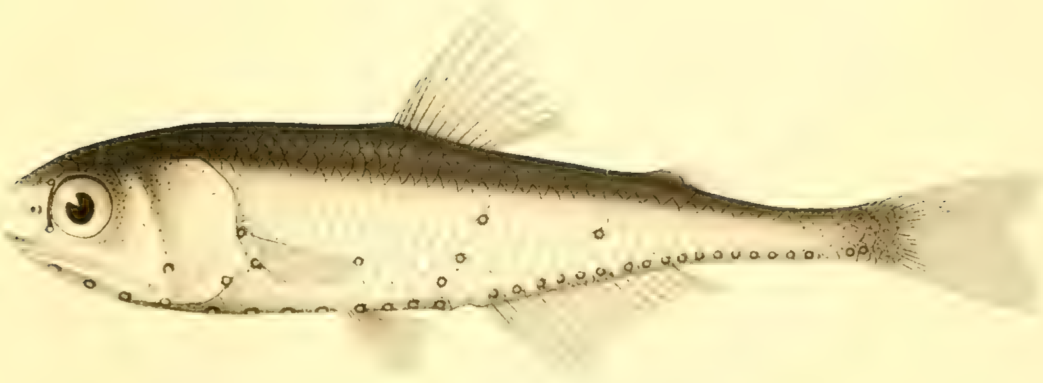
[a] This species was recognized by me as new and as representing a new generic type, and the descriptions here given had been prepared before the receipt of the paper by Mr. Fowler.



1. CENTROBRANCHUS CHŒROCEPHALUS FOWLER



2. CENTROBRANCHUS GRACILICAUDUS GILBERT. TYPE

In some specimens examined, a row of 5 to 7 luminous spots occupies the median line on the lower side of the caudal peduncle, one under each scale. Others have a row of similar but stronger spots on the back of the caudal peduncle. In either series the spots vary from 5 to 7 in number. Similar arrangements are found in *Rhinoscopelus coccoi* and *andreæ* (Lütken, Spolia Atlantica, Scopelini, pp. 243 and 245). From the fact that no individual possesses both the dorsal and the ventral series, Lütken suggests that the position of these spots may be a sexual character. Dissection of three specimens of each kind of *C. chærocephalus* has shown that such is the case, the males having the dorsal series of stronger spots. The smallest specimen showing a trace of these spots is 25 mm. long, and the longest specimen in which none are apparent is 28 mm. Males are somewhat more abundant than females.

General color dark on back, silvery on lower half of sides, with bluish and reddish reflections; dorsal and caudal dusky, base of caudal blackish.

Specimens were taken at the following stations: No. 3912, south of Oahu, surface; 3926, west of Oahu, surface; 3927, west of Niihau, surface; 3929, south of French Frigate Shoals, surface; 3930 near Laysan Island, surface; 3932, near Laysan Island, surface; 3980, south of Oahu, surface; 4009, east of Kauai, surface; 4011, west of Oahu, surface; 4145, west of Niihau, surface; 4188, between Honolulu and San Francisco, lat. N. 28° 13′ 42″, long. W. 145° 44′, surface.

Centrobranchus chærocephalus Fowler, Proc. Ac. Nat. Sci. Phila., 1903 (Jan. 13, 1904), 754, near the Sandwich [Hawaiian] Islands. (Type, No. 7972, A. N. S. P., Coll. Dr. Wm. H. Jones.)

Centrobranchus gracilicaudus, new species. Plate 69, Fig. 2.

Type 33 mm. long, from the surface at station 4145, west of Niihau Island; type, No. 51518, U. S. Nat. Mus.

Closely related to *C. chærocephalus*, with which it agrees in all essential features except the following: (1) Supra-anals arranged in an oblique line, the middle spot vertically above the vent, the lowest vertically above the fourth of the ventral series. The species differs from *C. chærocephalus*, therefore, very much as *Rhinoscopelus andreæ* (Lütken) differs from *Rhinoscopelus coccoi* (Cocco). (2) Anals averaging a little more numerous, in the 11 specimens collected, the sum of the two groups being 16 in 8 cases, 17 in 12 cases, 18 in 2 cases. The anterior group consists always of 6 or 7 spots (6 in 15 cases, 7 in 7 cases), while in *chærocephalus* 5 and 6 are equally abundant and 7 is rare. Of postero-anals, there are 9 in 3 cases, 10 in 7 cases, 11 in 12 cases. In *chærocephalus* 10 is much more abundantly represented than 11. The limited number of specimens in the species here described renders the averages not wholly reliable, but they are obviously different from the averages in *chærocephalus*. (3) Scales of mid-lateral series more persistent, and deeper in proportion to their width. (4) Body deeper and snout somewhat less projecting.

Dorsal 12; anal 19; scales in mid-lateral series 38 or 39. Greatest depth of body 23 hundredths of the total length without caudal; least depth of caudal peduncle 5; length of head 28; diameter of orbit 7; interorbital width 7.5; length of snout 7; projection of snout beyond maxillaries 4; length of maxillary 17; distance from tip of snout to front of dorsal 47, from front of dorsal to adipose dorsal 29, from front of adipose dorsal to rudimentary caudal rays 26, from tip of snout to origin of anal 56; length of pectoral 14; length of ventral 10.

With the exceptions noted, the shape of the body, size and relative position of fins, character of scales, and the number and arrangement of the photophores are as in *C. chærocephalus*.

Specimens were taken at the following stations: No. 3926, west of Oahu, surface; No. 3927, west of Niihau, surface; No. 3929, southwest of French Frigate Shoals, surface; No. 3930, near Laysan Island, surface; No. 4011, west of Oahu, surface; No. 4145, west of Niihau, surface.

KEY TO HAWAIIAN SPECIES OF MYCTOPHUM.

a. Three pairs of ventral photophores along the median line.......... *fibulatum*, p. 596
aa. Four pairs of ventral photophores along median line.
  b. Posterolateral single.
    c. Supra-anals forming a straight line rising obliquely from near the last ventral.......... *margaritatum*, p. 596
    cc. Supra-anals forming an obtuse-angled triangle, the middle and lower photophores at about the same level, the lower much in advance.......... *evermanni*, p. 597
  bb. Posterolaterals two.
    d. Supra-anals forming an obtuse-angled triangle.......... *braueri*, p. 598

Myctophum fibulatum Gilbert & Cramer.

Two specimens, dredged at depths of 220 to 284 fathoms, do not differ from the type in number and distribution of the photophores. The species is peculiar in having but 3 equally spaced pairs of ventral photophores along median line, the second pair being displaced laterally, almost vertically above the first pair. The anterior pair of the supra-anals lies over the interspace between the third and fourth ventrals. A small black-ringed photophore on the anterior orbital rim escaped notice in the type. One small specimen was taken in the surface tow-net, at station 3889, north of Molokai; others were obtained at stations 3899, Pailolo Channel, 283 to 284 fathoms, and 4082, off the north coast of Maui, 220 to 238 fathoms.

Myctophum fibulatum Gilbert & Cramer, Proc. U. S. Nat. Mus., xix, 1897, 411, pl. 38, fig. 2 (not fig. 3, as erroneously indicated on plate 38 and in the description).

Myctophum margaritatum, new species. Plate 68, Fig. 2.

Type 80 mm. long, from the surface at station 3930, off the south coast of Molokai; type, No. 51536, U. S. Nat. Mus.

Closely related to *M. affine* Lütken and *M. opalinum* Goode & Bean, from the Atlantic. These two species are insufficiently described, and may even prove to be identical with each other and with the species here described. Certain differences are, however, indicated in the descriptions as they stand.

Greatest depth of body 24 hundredths of total length without caudal; least depth of caudal peduncle 8; length of head 27; diameter of orbit 9; interorbital width 10; length of snout 4; length of maxillary 17; distance from tip of snout to front of dorsal 44, from front of dorsal to adipose dorsal 37, from front of adipose dorsal to rudimentary caudal rays 21, from tip of snout to ventrals 41, from tip of snout to origin of anal 57; base of anal 27; length of pectoral 15; length of ventral 12. D. 13; A. 20; P. 15; V. 9, the outermost ray minute; scales in the lateral line 40, the 41st on the base of the caudal fin and without tube; 9 scales in a cross-series excluding median rows on back and belly.

Body rather slender, heavy forward, snout very short and bluntly rounded, the profile descending in a strong, nearly uniform curve from occiput to front of nostrils; eyes very large, one-third length of head, slightly less than frontal width above their middle; snout and frontal region with low concealed median crests; mouth oblique, maxillary gradually widening posteriorly, extending well behind the orbit, its length slightly less than two-thirds that of head; teeth minute, in narrow bands in each jaw, those on vomer in 2 small, widely separated clusters, those on palatines larger than the others, in single series; in addition to these, all the roof of the mouth, except its middle line, is covered with minute asperities; preopercle nearly vertical, its margin entire; opercle entire and unstriated, except for a short space below the upper posterior angle, where the margin is weakly ribbed and toothed; gill-rakers long and slender, 5+16 on outer arch, the longest slightly more than half the diameter of orbit.

First dorsal ray over the eleventh scale of lateral line; root of ventrals opposite the ninth or tenth; first anal ray under the eighteenth, last under the thirty-first; origin of adipose dorsal over the twenty-ninth; pectorals not reaching middle of ventrals; ventrals not reaching vent.

Scales all thin, not spinous, the margins entire or only gently notched or sinuate, those of the lateral line not enlarged.

Photophores arranged as in *M. affine* Günther and *M. opalinum* Goode & Bean; preoculars 1, minute, similar to those on body, on the lower anterior orbital rim; mandibulars 3; operculars 2, the one behind the tip of maxillary concealed beneath the margin of the preopercle; pectorals 3, forming a right angled triangle, the middle spot on lower edge of pectoral base, the upper encroaching on third scale of lateral line, the lower on line between pectoral base and the first thoracic spot; thoracics 5, the third and fourth less widely separated than the others, the 5 pairs arranged in 2 nearly straight gently diverging lines; supra-ventrals 1, nearly midway between the axil of the ventrals and the lateral line; ventrals 4, equally spaced; supra-anals 3, in an oblique line directed toward interspace between third and fourth ventrals; anals 13 to 17 (usually 14 or 15), in 2 well-separated groups, 8–10+5–7, the usual formula being 9+6, 9+5, or 10+5, the series throughout parallel with the lower outline; posterolateral 1, over the last antero-anal; caudals 2, closely approximated, the posterior little higher than the anterior; the third supra-anals and the posterolaterals encroach upon the series of scales which bear the lateral line, the former below the eighteenth, the latter below the twenty-eighth scale of the series; each of these scales is greatly shortened in its lower half to make room for the special scale of the photophore, and is but little more than half the height of the other scales; the posterolateral is over, or very slightly in advance of the last antero-anal, the latter vertically over the fourth anal ray before the last and below the front of the adipose fin.

The photophores are invariable in number and position, except those of the anal series. Our material includes 63 specimens. As each side must be tabulated separately, we have for consideration 126 cases:

The antero-anals are 8 in number in 7 cases, 9 in number in 88 cases, 10 in number in 31 cases. The postero-anals are 5 in number in 62 cases, 6 in number in 55 cases, 7 in number in 9 cases. Combining these gives a total range of 13 to 17, distributed as follows: 13 in 3 cases, of which 2 occur bilaterally, 1 unilaterally; 14 in 37 cases, of which 24 occur bilaterally, 13 unilaterally; 15 in 74 cases, of which 60 occur bilaterally, 14 unilaterally; 16 in 10 cases, of which 6 occur bilaterally, 4 unilaterally; 17 in 2 cases, of which none occur bilaterally, 2 unilaterally.

The usual combinations are 9+5 (32 cases) 9+6 (48 cases) and 10+5 (23 cases), one or another of these combinations occurring on one or both sides of 56 out of the 63 specimens at hand. The 2 sides do not vary independently in this species. Perfect bilateral symmetry occurs in 46 specimens, and in 6 others the lack of symmetry is plainly due to the dropping out of the second or the penultimate member of the anterior group. In no case does the difference in number of anals on the 2 sides exceed 1.

General color dusky brown on upper half of head and body; sides of head and lower half of sides silvery, the latter everywhere coarsely specked with brown; anterior dorsal dusky, base of caudal blackish, other fins translucent. In the type, 7 scales on the back of the caudal peduncle are underlaid by pearly (luminous) spots, agreeing in this respect with *M. opalinum.* None of the smaller specimens (47 mm. and less) shows any trace of this luminous area.

M. margaritatum agrees in outline very closely with Lütken's figure of *M. affine* (Spolia Atlantica, II, Scopelini, 1892, p. 252). It seems to differ in the more numerous scales of the lateral line, in the more anteriorly placed break in the anal series, the more elevated posterolateral, and in the somewhat different range of variation in the number of anal spots. In *M. affine,* the antero-anals vary from 7 to 10 (frequently 8 or 9); in *M. margaritatum,* the number 7 does not occur, and 8 very rarely, 9 and 10 prevailing. In *M. affine,* the postero-anals vary from 4 to 6 (frequently 5 or 6); in *M. margaritatum,* no specimens have 4, but a few have 7.

The species was taken at the following stations: Nos. 3878, south of Lanai; 3926, west of Oahu; 3927, west of Niihau; 3929, southwest of French Frigate Shoals; 3930, near Laysan Island; 3931, near Laysan Island; 3932, near Laysan Island; 3980, south of Oahu; 4010, west of Oahu; 4011, west of Oahu; 4145, west of Niihau, and 4188, between Honolulu and San Francisco, lat. N. 28° 13′ 42″, long. W. 145° 44′ 00″; all at the surface.

Myctophum evermanni, new species. Plate 70, Fig. 2.

Type, 29 mm. long, from station 3980, south of Oahu, taken at the surface; type, No. 51521, U. S. Nat. Mus.

Related to *M. boops* and *M. humboldti,* but with a short postero-anal series of photophores (4 to 6), the first of the series much farther back than in related species, a little behind the last anal ray. In *M. boops,* Richardson, and *M. humboldti* (Risso), the break in the anal series is but little behind the middle of the fin.

Total length, excluding caudal, 22 mm.; greatest depth of body 22 hundredths of this length; least depth of caudal peduncle 7; length of head 33; diameter of orbit 8; frontal width over middle of eye 9; length of snout 7; length of maxillary 23; distance from tip of snout to front of dorsal 51; from front of dorsal to adipose dorsal 36; from tip of snout to front of anal 50; base of anal 26; ventrals 16; pectoral broken. D. 15, the 4 anterior rays much shortened; A. 20; lateral line with 39 tubes; 9 longitudinal series of scales where body is widest, not including the median series above and below.

Head and body very slender, the caudal peduncle deeper in proportion; head tapering forward, the snout not bluntly rounded; maxillary very long, little widened posteriorly, half its length behind middle of eye; eye little longer than snout; preopercular margin not very oblique.

Origin of the dorsal slightly behind insertion of ventrals, its posterior rays slightly overlapping the anal; vertical from front of adipose dorsal passing through the posterolateral photophore and the base of the fourth anal ray before the last; ventrals reaching front of anal; the pectorals are broken in the type; in some of the cotypes they are intact and are comparatively short, not reaching the middle of the ventrals, and falling a little short of the anterior supra-anal.

Scales thin, entire, caducous, those of the lateral line very little larger than the others.

Arrangement of photophores: As in *M. boops* and *M. humboldti*, the 3 supra-anals are so disposed as to form an obtuse-angled triangle, the uppermost in contact with the lateral line vertically above origin of anal fin, the second midway between the upper supra-anal and the last ventral photophore, the third anterior to the second and on a level with it, a little behind second ventral pair; supra-ventral on a level with base of pectoral, a little higher than third supra-anal, somewhat nearer lateral line than ventral base; pectorals forming the usual right-angled triangle, the lower vertically above the second thoracic pair, the upper somewhat nearer lateral line than pectoral base; posterolateral in contact with lateral line, slightly behind last antero-anal; two opercular spots, upper the largest and lower the smallest of all the photophores; mandibulars 3 as usual; no preocular photophore can be detected in these young specimens. The first and second pairs of thoracics are more widely separated than the other pairs, which are evenly spaced, the 2 lines diverging posteriorly. The 4 ventral pairs are evenly spaced and form parallel lines.

The anals vary from 12 to 14, the antero-anals from 7 to 9, the postero-anals from 4 to 6. They are distributed as follows in the 70 cases (35 specimens): Antero-anals 7 in 6 cases, 8 in 58 cases, 9 in 6 cases; postero-anals 4 in 6 cases, 5 in 57 cases, 6 in 7 cases; totals, 12 in 6 cases, 13 in 57 cases, 14 in 21 cases. Combinations found bilaterally are 7 + 5, 7 + 6, 8 + 5, 9 + 4; 8 + 5 occurs on one or both sides of 30 of the 35 specimens in the collection. As *M. humboldti* has typically 8 + 8 anals, and *M. boops* 8 + 10, it would be entirely inadmissible to identify *M. evermanni* with either of these species. In one of the cotypes of *M. californiense* Eigenmann, I find the anals 6 + 11. The 2 caudal photophores in *M. evermanni* are arranged a little obliquely and are separated by an interspace a trifle wider than that between the pairs of postero-anals.

General color blackish, except cheeks, nostrils, and a part of the opercles, which are whitish; base of caudal lobes black.

The species was taken at the following stations: Nos. 3878, south of Lanai; 3926, west of Oahu; 3927, west of Niihau; 3931, near Laysan Island; 3932, near Laysan Island; 3980, south of Oahu, and 4145, west of Niihau; all at the surface.

Named for Dr. Barton Warren Evermann.

Myctophum braueri, new species. Plate 70, Fig. 1.[a]

Type, 57 mm. long, from station 3980, south of Oahu, surface tow; type, No. 51527, U. S. Nat. Mus.

Closely related to *M. reinhardtii* Lütken, from the Mediterranean, differing, in so far as appears from Lütken's figure and very brief description (Spolia Atlantica, II, Scopelini, 1892, 257), in the slightly lower position of the anterior supra-anal photophore, the slightly higher insertion of the supra-ventral, and the much longer dorsal and anal fins (with 11 and 16 rays, respectively, in *M. reinhardtii*).

Greatest depth of body 21 hundredths of total length without caudal; least depth of caudal peduncle 7; length of head 28; diameter of orbit 13; frontal width over middle of eye 8; length of snout 5; length of maxillary 19; distance from front of snout to tip of dorsal 45; from front of dorsal to adipose dorsal 37; from front of adipose dorsal to rudimentary caudal rays 18; from tip of snout to ventrals 41; to origin of anal 58; base of anal 28; length of pectoral 30; of ventrals 12. D. 14; A. 22 (23 in other specimens); P. 14; V. 8; scales in lateral line 40 or 41, 9 in a cross-series, excluding median rows along dorsal and ventral outlines.

Body very slender, eye remarkably large, mouth oblique, snout short but pointed, upper profile not abruptly decurved; orbital diameter little less than half length of head; interorbital width a little less than three-sevenths; maxillary reaching the vertical from posterior border of eye, greatly widened posteriorly and bearing a lengthwise ridge parallel with its dorsal margin; a narrow strip of its ventral portion protrudes below premaxillary near its tip; gape of mouth showing a double curve, convex upward in its posterior portion, concave upward anteriorly; mandible upturned toward symphysis, its tip acute, protruding a little beyond premaxillaries.

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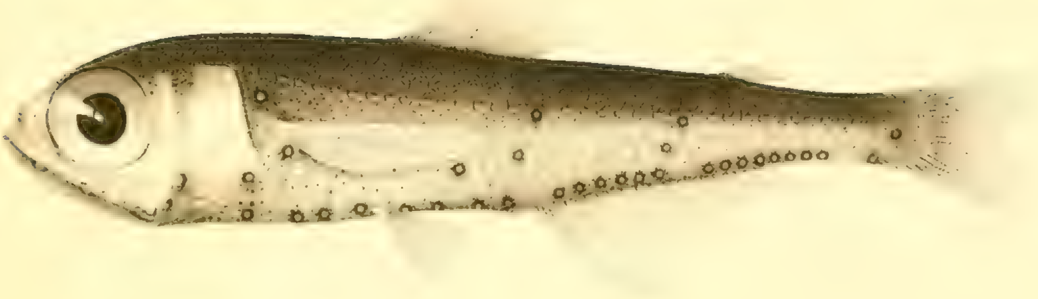
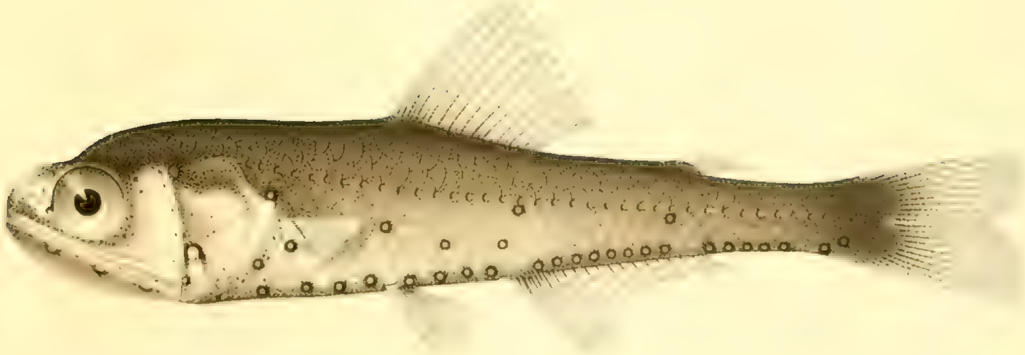
[a] *Myctophum lutkeni* on plate, by error.



1. MYCTOPHUM LUTKENI GILBERT. TYPE



2. MYCTOPHUM EVERMANNI GILBERT. TYPE.

Teeth on jaws and palatines in very narrow bands; broad bands investing the mesopterygoids; head of vomer bearing on each side a strongly protruding lobe, devoid of teeth, the concave interspace bearing minute asperities; gill-rakers long and slender, 4 + 14 in number on outer arch; preopercular margin vertically placed and evenly rounded.

Insertion of first dorsal ray slightly behind the vertical from base of ventrals, the last dorsal ray vertically over the first anal ray; adipose dorsal over second postero-anal photophore, well in advance of last anal ray; pectorals very long and pointed, their tips reaching vent and extending beyond tips of ventrals.

Scales thin, with entire edges, and caducous, occasional scales only being preserved in our material.

Arrangement of photophores: Agreeing with *M. reinhardtii* in the obtuse-angled triangle formed by the 3 supra-anals, in the presence of 2 posterolaterals, in the wide separation of the 2 caudals, and in the normal position of the supra-ventral. A minute preocular present on lower anterior orbital rim, similar to other photophores, but much smaller; first and second, and second and third pairs of thoracic photophores more widely separated than the others, the third and fourth pairs nearer together than the others; upper pectoral spot immediately below third scale of lateral line; supra-ventral on a level with middle pectoral and middle supra-anal spots, and constantly a little above anterior supra-anal; upper supra-anal, upper posterolateral and upper caudal spots in contact with lateral line at 18th, 26th, and 40th scales, respectively; lower posterolateral in advance of upper, and very slightly in advance of last antero-anal.

The number of photophores is as follows: Preoculars 1; mandibulars 3; operculars 2, the lower not concealed; pectorals 3, the middle one immediately below the base of lowest pectoral ray, the lower one on a line joining the middle pectoral and the lower opercular spots; thoracics 5, those of the last pair more widely separated; ventrals 4, the third and fourth pairs less widely spaced than the others; anals 6 to 8 + 6 to 8 (13 to 15); caudals 2; supraventrals 1; supra-anals 3; posterolaterals 2.

The anals form the only variable groups. In the 17 specimens (giving 34 cases) of the collection, we find them distributed as follows: Antero-anals 6 in 14 cases, 7 in 18 cases, 8 in 2 cases; postero-anals 6 in 2 cases, 7 in 23 cases, 8 in 9 cases. In both groups then, the mode is 7, the anterior group varying principally toward 6, the posterior group toward 8. The totals of the 2 groups, in the 34 cases, are as follows: 13 in 7 cases, 14 in 25 cases, 15 in 2 cases. In the type there is a well-developed luminous patch on the lower side of the caudal peduncle, and an incipient patch on the dorsal surface.

General color dark, with bluish reflections from opercles and scales on sides; caudal with a dusky patch at base of each lobe; other fins translucent.

Specimens were taken at the following stations: Nos. 3878, south of Lanai; 3927, west of Niihau; 3980, south of Oahu; and 4145, west of Niihau; all at the surface.

Named for Dr. August Brauer, the author of a most useful review of the genus *Myctophum*.

Dasyscopelus spinosus (Steindachner).

Forty-nine specimens, the longest 69 mm., were taken at the surface about the Hawaiian Islands, and in the vicinity of Laysan Island. They agree in all essential features with the excellent descriptions and figures cited below. The pectoral fins are a little longer and more pointed than previously represented, reaching with their tips a little beyond the ventrals, but not quite to vent. The scales of the lateral line are little longer than the neighboring scales. They are almost wholly concealed by the overlapping series above and below, the scales of which are arranged vertically with reference to them.

Dorsal with 13 or 14 rays, anal 19; 40 scales in lateral line, 9 in a cross-series, excluding the mid-dorsal and the mid-ventral rows.

Variation in number and disposition of photophores is confined to the anal series. The total number of these varies from 13 to 15 (abnormally 12 in the anterior group on one side of one specimen), the prevailing number being 14 (7 + 7). The following combinations occur: 7 + 7 and 7 + 7 in 26 specimens; 7 + 7 and 7 + 6 in 3; 7 + 7 and 6 + 7 in 1; [illegible] + 7 and 7 + 5 in 1; 7 + 6 and 7 + 6 in 6; 7 + 8 and 7 + 8 in 1; 7 + 8 and 7 + 7 in 1; 7 + 8 and 8 + 7 in 1; 7 + 8 and 6 + 7 in 1; 8 + 6 and 8 + 6 in 5; 8 + 6 and 8 + 7 in 2; 8 + 7 and 8 + 7 in 1. From this it appears that the predominating combinations are 7 + 7, 7 + 6, and 8 + 6. In the anterior group, 8 occurs in 17 cases, 7 in 79, and 6 in 2; in the posterior group, 8 occurs in 5 cases, 7 in 65, 6 in 27, and 5 in 1. Thus, while 7 is the prevailing number in each group, the anterior group varies most frequently toward 8, the posterior group in the opposite direction. This compensatory variation is not due solely to the shifting of the photophore from the anterior to the posterior group, or in the opposite direction, for the supra-anals maintain a constant relation to the last antero-anal, whatever the number.

Specimens were taken at the following stations: Nos. 3878, south of Lanai; 3926, west of Oahu; 3927, west of Niihau; 3930, near Laysan Island; 3980, south of Oahu; 4009, west of Oahu; 4011, west of Oahu, and 4145, west of Niihau; all at the surface.

Scopelus spinosus Steindachner, Ichthy. Notizen, V, 1867, 11 (author's reprint), pl. 3, figs. 4–4a. China.

Scopelus (*Dasyscopelus*) *spinosus* Lütken, Spolia Atlantica, Scopelini, 1892, p. 239, pl. 1, figs. 1–2. Tropical Atlantic; Maldou Island, S. Pacific.

Dasyscopelus pristilepis Gilbert & Cramer.

One of the most abundant species at the surface, where young and half-grown specimens were frequently taken in the tow-net. One adult was found in the stomach of a dolphin, in the Honolulu market.

D. pristilepis agrees with *D. asper* (Richardson), the type of the genus, and differs from *D. spinosus* in the greatly enlarged thickened scales of the lateral line. The depth of these scales, when fully exposed, exceeds their distance from the base of the dorsal fin. In *spinosus*, the scales of the lateral line are very little if at all enlarged. In both species, the scales of the lateral line are overlapped and almost wholly concealed by the series above and below them, and the tubes of the lateral line are strongly developed, forming keel-like projections. *D. asper* differs from *pristilepis* in the presence of a large preocular photophore, extending from middle of eye forward to around nostrils; furthermore, the anal spots are 10 + 4, and the 2 caudal photophores are widely separated.

The number and distribution of the luminous spots in *D. pristilepis* have been tabulated in the 94 specimens of the collection. No variation was found, except in the anterior and posterior anals. These have for their normal formula 7 for the anterior group and 4 for the posterior, but the anterior may vary from 6 to 8 and the posterior from 3 to 5. A plus variation in the anterior group is more frequently connected with a minus variation in the associated posterior group, the 2 varying in a compensatory manner. For this reason, the variation in the total number of the anal spots found on one side of any individual is no greater than the total variation found in each group separately, and comprises only the numbers 10, 11, and 12. The combinations 6 + 3 and 8 + 5, although within the ascertained range of variation of anterior and posterior groups taken separately, do not occur in our material.

The 2 sides of a fish do not always agree in the number and arrangement of the spots. We must therefore tabulate each side separately, giving thus for consideration, with our material, 188 cases. Of these, we find in the anterior group: 6 photophores in 11 cases, 7 photophores in 160 cases, 8 photophores in 17 cases. In the posterior group: 3 photophores in 21 cases, 4 photophores in 157 cases, 5 photophores in 10 cases.

As already stated, the size of the 2 associated groups is not purely a matter of chance. Thus when the anterior group contains 6 photophores, only the combinations 6 + 4 and 6 + 5 are found, as follows: 6 + 4 in 5 cases, 6 + 5 in 6 cases. When the anterior series contains 7, it may be associated with 3, 4 or 5 in the posterior series, as follows: 7 + 3 in 9 cases, 7 + 4 in 147 cases, 7 + 5 in 4 cases. When the anterior series contains 8, only the combinations 8 + 3 and 8 + 4 are found, as follows: 8 + 3 in 12 cases, 8 + 4 in 5 cases.

Opposite sides of the same fish may vary independently, as appears from the occurrence of the following combinations: 7 + 3 occurs bilaterally in 2 specimens, unilaterally in 5; 7 + 4 occurs bilaterally in 66 specimens, unilaterally in 15; 7 + 5 occurs bilaterally in 1 specimen, unilaterally in 2; 6 + 4 occurs bilaterally in 1 specimen, unilaterally in 3; 6 + 5 occurs bilaterally in 2 specimens, unilaterally in 2; 8 + 3 occurs bilaterally in 4 specimens, unilaterally in 4; 8 + 4 occurs bilaterally in 1 specimen, unilaterally in 3. In deviations from the mode (7 + 4) there thus appears a distinct tendency toward a symmetrical variation. The chance nature of the association of groups on opposite sides of the same individual is evident from a consideration of the 15 specimens, noted above, in which 7 + 4 occurs unilaterally: the combination 7 + 4 and 7 + 3 occurs in 5 specimens; 7 + 4 and 7 + 5 in 1 specimen; 7 + 4 and 6 + 4 in 3 specimens; 7 + 4 and 6 + 5 in 2 specimens; 7 + 4 and 8 + 3 in 2 specimens; 7 + 4 and 8 + 4 in 2 specimens.

A minute photophore surrounded by a black ring is present on the lower anterior orbital margin. In the adult specimen only, 2 scales on lower edge of caudal peduncle cover luminous spots.

Specimens were taken at the following stations, all in the surface tow: Nos. 3878, south of Lanai; 3889, north of Molokai; 3912, south of Oahu; 3926, west of Oahu; 3927, south of Bird Island; 3929, south of French Frigate Shoals; 3930, near Laysan Island; 3980, south of Oahu; 4009, east of Kauai; 4010, east of Kauai; 4145, west of Kauai, Bird Island.

Dasyscopelus pristilepis Gilbert & Cramer, Proc. U. S. Nat. Mus., xix, 1897, 412, pl. 39, fig. 1.

Neoscopelus macrolepidotus (Johnson).

No Atlantic material has been at hand for comparison, but a single specimen from Japan[a] seems to to agree completely with the Hawaiian specimens. No individuals were taken at the surface, but it is perhaps doubtful whether the following stations, taken with other recorded depths, can be accepted as giving the vertical range of a bottom form: Nos. 3824, off the south coast of Molokai, 222 to 498 fathoms; 3892, off the north coast of Molokai, 328 to 414 fathoms; 3973, vicinity of French Frigate Shoals, 395 to 397 fathoms; 3979, vicinity of Bird Island, 222 to 387 fathoms; 3994, vicinity of Kauai, 330 to 382 fathoms; 4014, vicinity of Kauai, 362 to 399 fathoms; 4021, vicinity of Kauai, 286 to 399 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4041, off the west coast of Hawaii, 253 to 382 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms.

Family MAUROLICIDÆ.

Argyripnus ephippiatus Gilbert & Cramer.

Three specimens were obtained at the following stations: Nos. 4085, off the north coast of Maui, 267 to 283 fathoms; 4121, off the northwest coast of Oahu, 216 to 251 fathoms.

The species has been referred by Garman (Mem. Mus. Comp. Zool., XXIV, 1899, p. 399) to the genus *Valenciennellus* Jordan and Evermann. It differs, however, in the much more anterior position of the dorsal fin in comparison with the anal, and in the widely divergent arrangement of the photophores. An adipose dorsal is well developed, a character which escaped attention in the type owing to mutilation.

Argyripnus ephippiatus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 414, pl. 39, fig. 2.

Argyropelecus heathi, new species. Plate 72, fig. 1.

Type, 31 mm. long, from station 4107, Kaiwi Channel, between Oahu and Molokai, depth 350 to 355 fathoms; type, No 51632, U. S. Nat. Mus.

Head 3.5 in length to base of caudal; depth 1.9. D. VII+8; A. 11[b]; P. 9. Depth of body less than in other species of the genus, contained 1.3 in length of trunk and tail; caudal peduncle very slender, its least depth but half its length posterior to last anal ray; eyes lateral in position but directed vertically upward, separated by a very narrow ridge; longitudinal diameter of eye 0.3 the length of the head; exposed portion vertically oblong in shape, the vertical diameter being half greater than the horizontal; pupil confined to extreme upper half of exposed area.

Cleft of mouth nearly vertical; when closed the mandible fits within the upper jaw; mandibular symphysis with a scarcely noticeable prominence; length of maxillary contained 1.2 times in head, premaxillary lying along the anterior margin of its proximal half; premaxillary teeth minute, in a single series, the lateral teeth directed toward angle of mouth; beyond end of premaxillary bone, the maxillary is provided with a single series of similar teeth, all or nearly all retrorsely set; mandibular series with slightly larger hooked teeth, in a narrow patch at symphysis, a single series laterally; no teeth can be detected on the vomer or palatine bones; gill-membranes widely joined, free from isthmus; branchiostegal rays 9; gill-rakers long and slender, 6 + 12 on the outer arch; pseudobranchiæ well developed; the preopercular angle bears 2 large spines, the longer one directed vertically downward, the other obliquely upward and backward; the angular bears a short triangular spine, and the clavicular symphysis a similar larger spine; the abdominal crest, between ventral and pectoral fins, formed by the union of 12 pairs of plates, each of which covers a luminous organ, the plates without ridges, serrations or spines; posteriorly, for a space corresponding to the last 3 plates, the crest is formed by a very thin bony lamella derived from the pelvic girdle, this plate increasing in height posteriorly and terminating in a spine directed downward and backward, with a short spine at its base behind; in front of the spine, the margin of the plate is minutely serrulate; the plate before the dorsal fin is formed by fusion of the 7 protruding interspinals, which are regularly graduated in length, the last two of equal length and closely apposed, the others evenly spaced; no trace of an adipose dorsal fin; anterior anal ray under last ray of dorsal; distance from last anal ray to first rudimentary caudal ray slightly exceeding length of anal base; the anal consists of 6 closely-set anterior rays and 5 more widely-spaced shorter posterior rays; pectorals long, reaching base of ventrals. The ventrals are injured, but one fin being present, and in such condition that it can not be described. Caudal gently forked.

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[a] Since the above was written, the Japanese specimen referred to has been made the type of a new species, *N. alcocki* Jordan & Starks (Bull. U. S. Fish Com. for 1902, 580, pl. 2, figs. 1 and 2), but as no direct comparison has been made with Atlantic material, the name is not adopted in this paper.

[b] A wider interspace in the middle of the series apparently indicates the loss of a ray, thus making 12 in all.

The genus *Argyropelecus* is supposed to be scaleless, but the species here described is covered with extremely thin, high and narrow scales, wholly similar to those of *Polyipnus*. But few of these scales remain, in scattered patches, in the type. Where they have been lost, no scale pouches are evident.

Photophores arranged as in other species of the genus: A group of 4 at the base of the lower caudal lobe, a group of 6 above the fifth to ninth anal rays, the distance separating these groups nearly twice the length of the anal series; a series of 4 between ventrals and anal, and a series of 12 along the ventral margin, between pectorals and ventrals; above the posterior portion of the ventral series is a second horizontal row of 6 spots, on a level with the base of the pectorals, and in advance of these are 2 spots at a higher level, the posterior higher than the anterior; a small spot behind lower margin of orbit, one behind and one before preopercular angle, a series of 6 on each side of breast in front of pectoral fins, and a series of 6, one at the base of each branchiostegal membrane; each spot or group of spots has a deeply pigmented area above it.

Color: Greater part of head and trunk blackish, middle of trunk with silvery sheen; snout and mandible largely translucent; caudal peduncle whitish, with a series of small black spots along anterior half of middle line, a dark blotch on middle line at base of caudal fin, and a black area in connection with each group of photophores; front of mouth whitish, back of mouth and gill cavity jet-black.

The stomach was everted in the type, indicating that it came from a considerable depth. But one specimen was secured.

Family CHAULIODONTIDÆ.

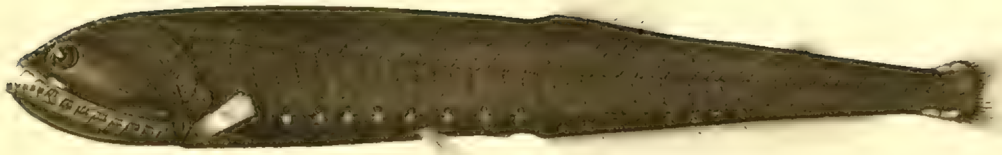
Cyclothone rhodadenia, new species. Plate 71, fig. 1.

Type, a female, 192 mm. long (excluding caudal), from station 4108, Kaiwi Channel, depth 411 to 442 fathoms; type, No. 51584, U. S. Nat. Mus.

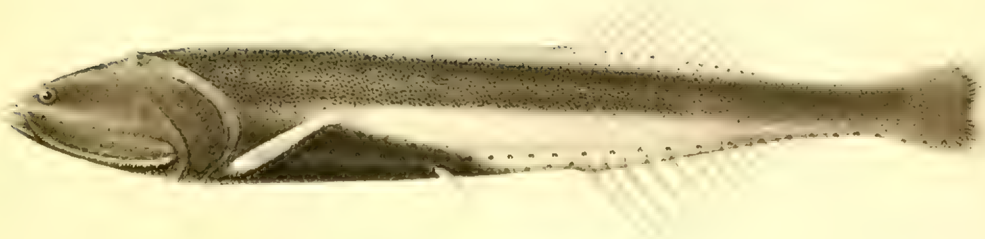
Very closely allied to *C. elongata* (Günther) (Deep-Sea Fishes, Challenger, p. 173, pl. 45, fig. B), from the Indian Ocean south of New Guinea, differing in the more numerous branchiostegal rays, the more posteriorly inserted ventrals, the more anteriorly placed adipose dorsal, the development of the glandular areas on caudal peduncle, and minor details in number and arrangement of lateral photophores.

D. 14; A. 30 or 31; P. 11 to 13; V. 8. The type and the single cotype measure respectively 192 mm. and 76 mm. in total length, exclusive of caudal fin. Below is a table of comparative measurements, expressed in hundredths of this length.

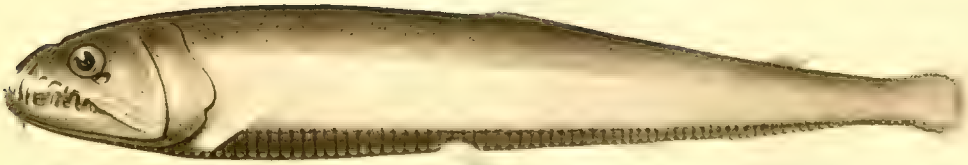
	Type.	Single cotype.
	mm.	*mm.*
Total length without caudal	192.0	76.0
Length of head (in hundredths)	21.5	22.5
Snout	4.0	4.0
Orbit	2.8	3.2
Interorbital width	4.0	3.0
Length of mouth to tip of maxillary	17.5	19.0
Length of mandible	18.5	19.0
Greatest depth of body	14.0	15.5
Least depth of caudal peduncle	4.0	4.6
Distance from snout to dorsal	58.0	58.0
Base of dorsal	11.0	11.0
Distance between dorsals	14.0	12.5
From front of adipose to base of middle caudal rays	18.5	19.0
Distance from snout to ventrals	44.0	44.0
Ventrals to anal	13.0	11.5
Base of anal	27.0	27.0
Caudal peduncle behind anal	9.0	11.0
Length of pectorals	9.0	8.5
Length of ventrals	8.0	9.0



1. CYCLOTHONE RHODADENIA GILBERT. TYPE



2. CYCLOTHONE CANINA GILBERT. TYPE



3. ASTRONESTHES LUCIFER GILBERT. TYPE

Eye small, two-thirds length of snout, which equals interorbital width; interorbital space containing a pair of narrow parallel lengthwise ridges, which fork anteriorly, the branches diverging to either side of nostrils; posteriorly, these ridges extend along sides of occiput, where they gently diverge; a similar ridge extends backward above the opercles; on median line of occiput, posteriorly, is a low rounded tubercle marked with radiating ridges; suborbital covering much less than half the cheek, forming a sheath overlying upper portion of maxillary for its entire length; teeth similar in both jaws, long slender subequal canines widely and equally spaced, and separated by 8 or 10 uniformly short teeth less than one-fourth their length; 12 canines along each side of the upper jaw; head of the vomer with a pair of short bramble-like teeth hooked backward; palatines with a single series, the first 2 or 3 elongate and canine-like, the others minute; roof of mouth, inside the palatine bands, with wide patches of small prickle-like teeth, 2 or 3 of the anterior outer ones enlarged; gill-rakers of the 2 series on each arch widely different; those of the outer series very long and slender, of the usual type, those of inner series much shorter, very slender and sharp, and fixed in an erect position; those of the outer series of the first arch 9 + 12 in number, the longest equaling the diameter of the orbit.

Both pectoral and ventral fins are broken, so nothing can be given as to their length; distance from axil of ventrals to vent two-fifths distance from ventrals to pectorals (one-half that distance in *C. elongata*); origin of dorsal vertically over the second or third anal ray; adipose dorsal more anteriorly inserted than in *C. elongata*, above the seventh anal ray before the last, and midway between last dorsal ray and base of middle caudal ray.

In the type of *C. elongata*, Günther seemed to find traces of scale-pouches on the caudal peduncle, but in other specimens, Alcock (Ann. Mag. Nat. Hist. 1891, 127, and 1892, 354) denied the presence of scales. In our type of *C. rhodadenia*, we are fortunately able to settle this question. The integument is preserved, and but little worn. Immediately behind the head, along the edge of the shoulder-girdle and below, 5 large scales are evident, all but one covering photophores. Another similar scale was detected in relation with one of the luminous glands on the tail, and others are almost certainly present covering other photophores. The scales are excessively thin and membranous, and are wholly concealed beneath the skin. They were detected by the concentric striæ showing through the somewhat hardened integument and were in 2 instances dissected out. Although the integument is in equally good condition over the general body surface, no further traces of scales could be detected. Those in connection with photophores probably would be the last to disappear in forms which were losing their scales.

The photophores are arranged as follows: Subocular 1, a definite photophore like those of the upper lateral series, located below the anterior part of the orbit, connected with a small oblong white glandular patch below and behind it; mandibulars 1, on the inner face of each ramus near the symphysis, a definite glandular body apparently connected with a small photophore; operculars 2, one indistinct, behind tip of maxillary, the other accompanied by a white glandular body, on preopercle at level of eye; branchiostegals 9, one at base of each interradial space, except the two anterior and the two posterior spaces; pectoral 1, vertically above base of pectoral fin and immediately behind shoulder-girdle, a little nearer pectoral than line of back. Upper lateral series 12 or 13, extending from just behind pectoral fin to a point opposite front of anal, each organ consisting of an upper inconspicuous luminous body, and a lower conspicuous white gland, composed of white convoluted tubules, which communicate with the photophore proper. Lower lateral series 43, forming continuous series from the isthmus to the base of lower caudal lobe; 4 are in advance of pectorals, the 2 lines strongly converging forward, 11 between the pectoral and ventral fins, 5 between the ventrals and the front of anal, 19 along base of anal, 1 under middle of caudal peduncle, and 3 along lower lobe of caudal; the vent lies between the fourth and fifth pairs of the ventral series; the first anal pair are vertically over the third anal ray, in line with the ventral series, and spaced equally with them; the second and third pairs of the anal series diverge from anal base in an obliquely curved line having its convexity directed upward and forward, the third pair being a little above level of upper lateral series, which is discontinued before it reaches them; the fourth, fifth, sixth, and seventh pairs again approximate the anal base, but the fourth and seventh are slightly above the fifth and sixth, the 4 thus forming a curved line with its convexity downward; from the eighth on, the lines are parallel and straight, the spaces between the spots gradually increasing posteriorly; there is no interruption between the anal and caudal series; the first caudal spot lies before the first rudimentary rays, the second over the middle of these rays, the third at a higher level, opposite the middle of the developed rays of lower lobe; a single small glandular patch on the back of the tail and 2 much larger ones below, each with a curved band of black pigment along its posterior margin. In addition to these there are along the sides numerous much smaller photophores, probably of simpler structure, arranged in definite series, each of these organs appearing as a light central dot surrounded by a narrow black ring. In one series they are arranged intersegmentally along the mid-lateral line; above and below this are two parallel lateral series, equally spaced, the spots in each series segmentally arranged and so disposed that they form with those of the other series obliquely transverse lines, those above the lateral line running upward and backward, those below, downward and backward. Others are disposed along the back and on the sides of the head, where no definite arrangement has been detected.

General color brownish black above, jet-black below; fins finely speckled, the pigment spots on rays of vertical fins usually arranged in cross-lines, which often correspond to the articulations of the rays. In life the glandular portions of all the photophores were brilliant ruby-red, including the lower portions of the upper lateral row, the lower portion of the subocular spot, the preopercular spot (surrounded by a silvery line), and the patches on upper and lower sides of caudal peduncle.

Stomach deeply cæcal, the sac sharply tapering to its posterior end, extending one-third the length of the abdominal cavity; pyloric cæca large, 6 in number.

Specimens were taken at stations Nos. 4019, vicinity of Kauai, 409 to 550 fathoms, and 4108, Kaiwi Channel, 411 to 442 fathoms.

Cyclothone canina, new species. Plate 71, fig. 2.

Type, 38 mm. long, from station 4005, vicinity of Kauai Island, depth 480 to 577 fathoms; type, No. 51545, U. S. Nat. Mus.

Differing from other species of the "*microdon*" group in the development of 3 pairs of slender canines near the mandibular symphysis. There are also other characteristic details of dentition, and minor differences in the proportions of the fins, the dorsal being a little larger, the anal a little shorter than in other species.

Length to base of caudal 60 mm.; head 22 hundredths of this length; snout 3.5; interorbital width 3; distance from tip of snout to end of maxillary 19; length of mandible 20; greatest depth of body 14; least depth of caudal peduncle 5; distance from tip of snout to front of dorsal 59; length of dorsal 20; distance from last dorsal ray to base of middle caudal rays 22; distance between pectorals and ventrals 22.5; from axil of ventrals to front of anal 14; length of anal base 27; distance from last anal ray to base of middle caudal rays 15; length of pectorals 12; length of ventrals 9; distance from ventrals to vent 5. D. 14; A. 18 (rarely 19); P. 13; V. 7; branchiostegals 14; gillrakers 9 + 15 or 16 on outer arch.

Mandible acute and projecting well beyond premaxillaries; teeth of mandibular series minute anteriorly, increasing in size along middle and posterior portion of jaw, 2 or 3 of the posterior teeth again diminishing; teeth not enlarged at intervals along the sides of the jaw, nearly erect, and numbering about 100 in each ramus; near the symphysis are 3 pairs of curved canines, the anterior pair smallest, the posterior largest; 3 pairs of similar incurved canines opposed to them in the premaxillaries, shorter than those in the mandible, the posterior again the largest; maxillary teeth increasing in length posteriorly, 2 or 3 of the posterior teeth again smaller; about 80 teeth in each maxillary, none of them greatly inclined forward, and none of them much larger than the corresponding mandibular teeth; every second or third tooth along middle and posterior part of the maxillary a little longer than the others, with the point turned downward; vomerine teeth forming 2 series gently converging forward, regularly increasing in size posteriorly, usually 3 in each series; palatine teeth confined to the anterior end, in 2 small detached groups, the anterior consisting of a moderate canine with 2 minute teeth to one side, which are detected with difficulty; posterior group consisting of 2 anterior teeth directed inward toward the middle line, and 2 or 3 others directed backward, the first of each set enlarged, all arranged in a single line; pterygoid teeth all small, forming a single, somewhat irregular series; gill-laminæ much shorter than in related species, their length less than the width of the arch to which they are attached; outer set of gill-rakers extremely long and slender, inner set shorter, fixed in an upright position.

An occasional large scale is still attached to sides of body in one of the cotypes. There is no adipose fin.

Arrangement of photophores: Subocular 1, with a short vertical bar of black pigment behind it. Preoperculars 2, one under its lower angle, the other on level of middle of sides. Branchiostegal photophores 10 (rarely 11). In the lower lateral series there are 13 between isthmus and ventrals; 5 between ventrals and anal, the third of these opposite the vent, the fourth and fifth on the translucent strip of body wall between vent and front of anal; 11 (rarely 10) along base of anal; 3 along caudal peduncle; 2 on base of caudal, the anterior opposite the rudimentary rays, the posterior scarcely more elevated, at base of lower caudal rays; there is no break in the lower lateral series, and none of the spots are elevated. Spots of the upper lateral series 7 to 10 in number, sometimes ceasing before ventrals, sometimes continued to a point opposite the vent; all small, like those of the lower series, and not provided with special gland of convoluted tubes.

Color dark brown above and on sides, black on abdomen and sides of head; basal portion of each dorsal and anal ray and each interspinous and interhæmal bone black.

Specimens were taken at the following stations: Nos. 3981, vicinity of Kauai, 414 to 636 fathoms; 4005, vicinity of Kauai, 480 to 577 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4026, vicinity of Kauai, 368 to 1021 fathoms; 4110, Kaiwi Channel, 449 to 460 fathoms; 4126, between Oahu and Kauai, 743 to 1278 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4154, vicinity of Bird Island, 636 to 850 fathoms; 4180, vicinity of Niihau Island, 417 to 426 fathoms.

Very young specimens of this species were frequently found adhering to the trawl webbing in all parts of the trawl, and this was frequently the case when the trawl had not reached the bottom. As it was taken only in deep hauls (over 400 fathoms), it must be a truly bathybial, but not a bottom form. The great reduction of the gill-laminæ is in favor of its bathybial habit.

Cyclothone atraria, new species. Plate 72, fig. 2.

Type, 53 mm. long (not including the injured caudal fin), from station 4187, the vicinity of Kauai Island, depth 508 to 703 fathoms; type, No. 52055, U. S. Nat. Mus.

Head 23 hundredths of total length without caudal; eye 2; distance from tip of snout to end of maxillary 19; snout 3.5; interorbital width 4; mandible 21; greatest depth (at nape) 14.5; least depth of caudal peduncle 5; distance from tip of snout to front of dorsal 58; base of dorsal 20; distance from dorsal fin to base of middle caudal ray 24.5; distance from base of pectorals to base of ventrals 23; from base of ventrals to front of anal 12; base of anal 30; distance from the last anal ray to the middle caudal ray 14; length of pectorals 12; of ventrals 10; distance from ventrals to vent 5. D. 15; A. 16; scales in about 28 transverse series, 15 or 16 in advance of the line joining first rays of dorsal and anal fins; gill-rakers of outer arch 7 + 13; branchiostegals 10.

Anterior half of maxillary containing very minute teeth, those near middle scarcely discernible; posterior half with about 17 teeth, regularly increasing in size posteriorly, all but 2 or 3 of the posterior teeth equally inclined forward and with slightly recurved tips, none of them enlarged or canine-like; premaxillary with 6 to 8 small teeth somewhat increasing in size anteriorly; mandibular teeth fine, close-set, inclining obliquely forward, those posteriorly increasing in length; anteriorly on each side are 2 widely-separated well-defined canines.

The scales have all fallen, but scars persist and are conspicuous. In other species known to us no trace of scales persists.

Color uniform black on head and body, and apparently also on the vertical fins.

Photophores are present as follows: Subocular 1; preoperculars 2; branchiostegals 9; of the lower lateral series, 13 between isthmus and ventrals (the 3 anterior crowded), 5 between ventrals and front of anal (the last nearly opposite first anal ray), 15 from front of anal to base of caudal, the latter arranged as in *C. canina;* the upper lateral series contains 8 photophores.

The type only is known.

Family ASTRONESTHIDÆ.

Astronesthes lucifer, new species. Plate 71, fig. 3.

Type, 75 mm. long, from station 4026, vicinity of Kauai Island, depth 368 to 1,021 fathoms; net probably not on the bottom; type, No. 51516, U. S. Nat. Mus.

Very closely related to *A. martensii* Klunzinger, from the Red Sea, differing in the very elongate pectorals and ventrals, and the much smaller eye.

Length to base of caudal 66 mm. Of this length the head forms 22 hundredths; diameter of orbit 4; bony interorbital width 4; length of snout 6; mouth measured from tip of snout to end of maxillary, 18; length of barbel 30; greatest depth of body 15; least depth of caudal peduncle 6; distance from tip of snout to base of dorsal 52; length of dorsal base 13; distance between dorsals 16; from front of adipose dorsal to base of middle caudal rays 21; distance from tip of snout to base of ventrals 48; length of anal base 15; distance between the lower adipose fin and the anal 7.5; length of ventrals 21; length of pectorals 18; height of dorsal 19. D. 12, the first ray very short, the last split to the base; A. 19; P. 6; V. 7.

Interorbital width equaling diameter of orbit, rather strongly grooved, and bounded on each side by 2 sharp ridges, which are closely apposed over the middle of the orbit and diverge forward and backward from this point; a minute bluntish protuberance at the upper posterior margin of the orbit, and behind this a third ridge, outside the 2 which bound the interorbital area; mandible massive, slightly protruding beyond premaxillaries; teeth notably smaller than those figured by Lütken (Spolia Atlantica, Scopelini, pl. 3, fig. 7) from Klunzinger's type of *A. martensii*. Near tip of mandible a very long slender canine, double on one side in the type, single on the other; nearer the symphysis a second pair, no longer than the shortest teeth on sides of mandible; teeth on one side of the mandible subequal and arranged regularly in pairs, one pair near the outer margin of the jaw alternating with another nearer its inner margin; posteriorly where overlapped by the maxillary, a few small teeth only, in line with those of inner row; arrangement less regular on the other side of the mandible, some of the teeth apparently fallen; two pairs of canines in front of premaxillaries, the inner pair not half the length of the outer; sides of premaxillaries with a few small canines like those in the mandible, apparently also arranged typically in pairs, though this is less evident; most of the canines slenderly arrow-shaped at tip; maxillary forming a trifle less than half margin of upper jaw and ending posteriorly in a short spine; it bears a single row of 15 to 20 very slender, close-set teeth, directed obliquely downward and backward; a single minute tooth on each side of the head of the vomer, a series of similar teeth on palatines; no teeth on tongue; gill-rakers represented by short spinous teeth arranged in pairs, of which 12 are present on the horizontal limb of the outer arch; barbel longer than head, with a dilated tip, reaching about to middle of pectorals.

Dorsal more anteriorly inserted than in *A. martensii*, its insertion midway between nostril and base of caudal, slightly behind insertion of ventrals; ventrals midway between end of maxillary and front of anal; when declined, the ventrals reach slightly beyond pre-anal adipose fin; front of adipose dorsal over fourth or fifth anal ray, thus far in advance of middle of fin; pectorals extending over two-thirds their distance from ventrals.

In color this species agrees with *A. martensii*, being grayish silvery on sides of head and body, brownish black above, black on under parts; fins translucent, unmarked.

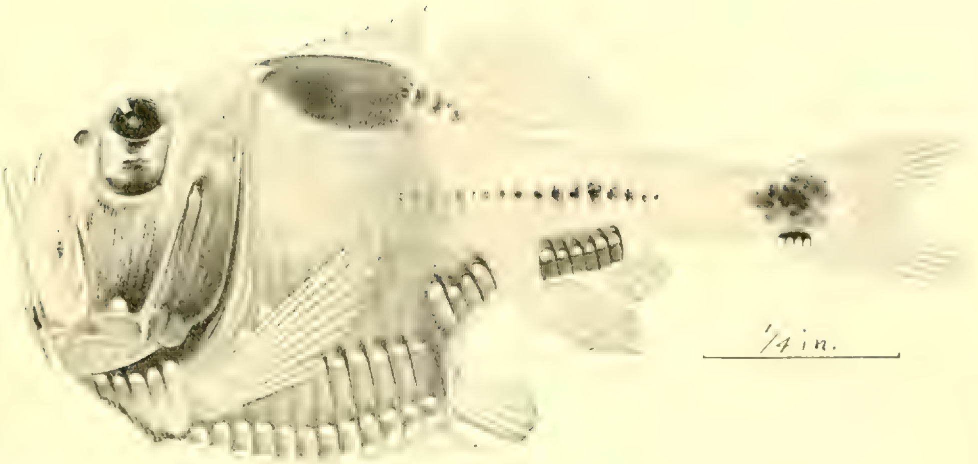
The photophores show a similar arrangement: Operculars 2. Branchiostegals 18, one for each ray. Jugulars 8, along the sides of the isthmus. Thoracics 22, 4 of these in advance of axils of pectorals. The jugulars and thoracics form continuous series, the 2 parallel anteriorly, strongly diverging posteriorly to reach the bases of the ventrals. Ventrals 22, the anterior 2 pairs in advance of the ventrals, between the diverging ends of the thoracic series. Anals 2+8, a wider interspace between the second and third; the last 2 are smaller than the others and diverge upward in a curved line. Caudals 4. The subocular photophore is shorter and rounder than in Lütken's figure, and is farther back, none of it under the pupil; its posterior end is much nearer the eye than the maxillary. The entire body is covered with minute pores, which appear black on the silvery portions, light on the blackish areas, and are arranged in more or less regular cross series.

A single cotype was obtained at station 3918, off the south coast of Oahu, depth 257-294 fathoms.

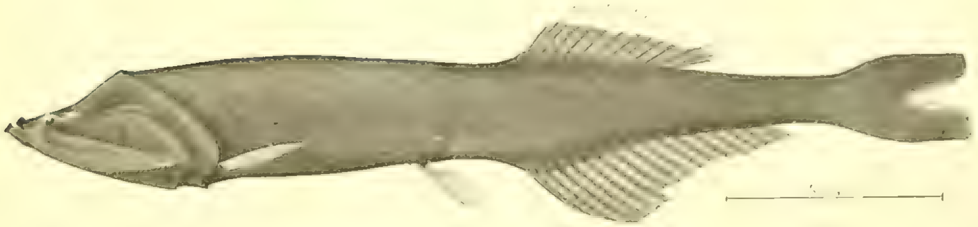
Family STOMIIDÆ.

Leptostomias, new genus.

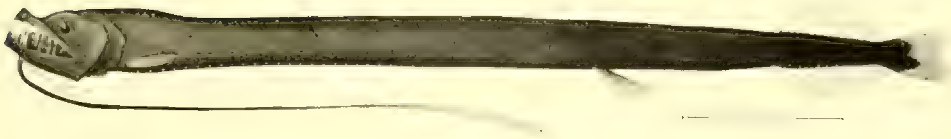
Body extremely elongate, but little compressed, without scales; mouth very wide; anterior teeth slender, fang-like, unequal, projecting outside jaws in closed mouth; a pair of slender teeth on vomer, a similar tooth on each palatine and a pair on tongue; branchiostegal rays 17; no pseudobranchiæ; eye very small; pectoral without detached ray; ventrals inferior, far behind middle of length; dorsal and



1. ARGYROPELECUS HEATHI GILBERT, NEW SPECIES. TYPE.



2. CYCLOTHONE ATRARIA GILBERT, NEW SPECIES. TYPE



3. LEPTOSTOMIAS MACRONEMA GILBERT, NEW SPECIES. TYPE.

anal opposite and nearly equal; no lateral line; head and body thickly beset with minute photophores which can be distinguished only by the aid of a lens, and are most abundant along lower half of sides; two series of larger photophores along each side of ventral line.

Leptostomias Gilbert, new genus of *Stomiidæ* (*macronema*).

Leptostomias macronema, new species. Plate 72, fig. 3.

Type, 74 mm. long, from station 4177, vicinity of Niihau Island, depth 319 to 451 fathoms; type, No. 52056, U. S. Nat. Mus.

Head 13 hundredths of total length without caudal; greatest depth (at occiput) 7; greatest depth of trunk 5; depth of caudal peduncle 3; width of trunk 3; length of snout 4; diameter of orbit 2; interorbital width 3; length of upper jaw 8; length of gular filament 60; distance from tip of snout to ventrals 65; from ventrals to front of anal 21; length of ventrals 8.5; base of anal 11; distance from tip of snout to front of dorsal 85; base of dorsal 8. D. 16; A. 20; V. 8; P. 7.

Snout rather slender, much as in *Eustomias*, its upper profile concave owing to the upward projection of the premaxillaries; teeth in a single series in each jaw, slender, fang-like, alternately long and short, about 7 or 8 on each side in mandible and premaxillaries, longest teeth a pair of canines near front of upper jaw corresponding to a pair of slightly shorter canines in mandible; a single slender tooth on extreme outer angle of vomer on each side, a similar tooth near middle of each palatine, and a pair on tongue; gill-rakers short, spine-like, 9 on horizontal limb of outer arch; gular filament very long, reaching nearly to base of ventrals, expanded near tip and then again tapering.

Color of head and body jet-black; barbel black on its basal half, translucent or whitish distally; fins translucent.

Four small photophores on side of head, one a short curved bar on hinder edge of orbit, the others small round spots, one on subopercle, one near tip of maxillary, one near mandibular angle; a series of photophores on branchiostegal membrane, one for each interradial space; in addition to the minute luminous points thickly covering the surface, there are 2 longitudinal series of photophores along each side of mid-ventral line, the lower series of each side passing between ventral fins and forming closely approximated pairs; of the latter, 42 are in front of ventral fins, 16 between front of ventrals and anal, 8 opposite base of anal, and 6 on caudal peduncle; the anterior spots of this series are somewhat irregular in arrangement. The upper longitudinal series are well below middle of sides, and extend from head to opposite front of anal, containing 63 photophores.

Only the type known.

Family PARALEPIDÆ.

Lestidium, new genus.

Like *Sudis*, but the skin wholly naked, except for a series of small scales along course of lateral line, which are wholly embedded and concealed beneath the skin; lateral line terminating about opposite middle of anal fin; dorsal inserted behind ventrals; adipose fin above last anal rays; mid-ventral region compressed and carinate, the fleshy keel extending from vent to isthmus; vomer toothless; premaxillaries forming entire margin of jaw and provided with a series of short, backwardly-hooked teeth; mandibles and palatines containing long fangs; branchiostegal rays 7 in number, the membranes overlapping and connate anteriorly, free from the isthmus; pseudobranchiæ present; a photophore directed downward and backward at lower orbital margin; sensory canals of head much branched, the tubes covering the opercles, mandibles, and preorbitals.

Lestidium Gilbert, new genus of *Paralepidæ* (*nudus*).

Lestidium nudum, new species. Fig. 236.

Type, 20 cm. long, from station 3899, Pailolo Channel, between Molokai and Maui, depth 283 to 284 fathoms; type, No. 51615, U. S. Nat. Mus.

Head 22 hundredths of length to base of caudal; greatest depth 8.5; least depth of caudal peduncle 2; longitudinal diameter of orbit 4; interorbital width [illegible]; length of snout 11; length of maxillary 10.5; tip of snout to ventrals 54, to dorsal 61, to anal 86. D. 9; A. 33; V. 10; P. 13; lateral line with 68 concealed scales.

Body elongate, compressed, deepest at nape, thence tapering gently to the very narrow caudal peduncle; head long, posteriorly compressed; snout long and sharp; eye in posterior half of head, its vertical diameter exceeding the horizontal diameter; interorbital space and occiput nearly flat; a pair of low ridges above each orbit; mandible included within margins of upper jaw, the latter transversely arched to receive it; the rounded end of mandible upturned to fit into an emargination of the premaxillaries; premaxillaries narrow, closely apposed to maxillaries, which fail to reach the vertical from front of eye; about half the width of the narrow maxillary for its entire length slips under the free margin of the preorbital, which continues as a conspicuous fold to below front of eye; upper jaw nonprotractile; the anterior arched portion of the premaxillaries toothless; near the front, on each side, is a long, depressible canine, preceded by a much smaller depressible tooth; behind these, after a short toothless interval, is a single series of short, fixed, bramble-like teeth, hooked backward, growing minute toward angle of mouth; all of the premaxillary teeth shut outside the mandible; mandibular teeth in 2 series, an outer row of short, fixed teeth and an equal number of inner, long, fang-like canines, which are depressible; the canines are widely spaced, about 8 in number on each side; palatine teeth similar, arranged in about 5 pairs, each consisting of an outer, short, fixed tooth and an inner, depressible fang, the middle fangs on each side a little the longest; vomer toothless; on each side of middle of tongue a lengthwise series of small, depressible teeth hooked backward; anterior nostril very small, closed from in front by a short, triangular flap; it is placed high and is distant from eye 0.3 the length of snout; posterior nostril a horizontal slit midway between anterior nostril and eye, and slightly above middle of orbit; gills 4 in number, with a slit behind fourth arch; gill-rakers represented by series of short, sharp spines on each arch; pseudobranchiæ well developed, occupying a pocket made by a fold of the membranous lining of the cheek and a ligamentous band from upper end of outer gill-arch; subocular photophore small, but well developed.

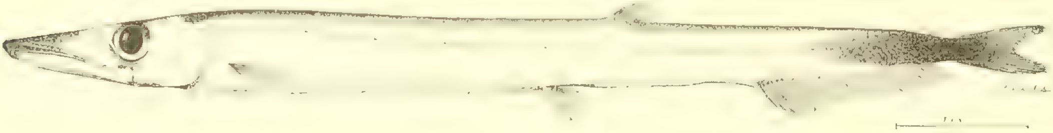


FIG. 236.—*Lestidium nudum* Gilbert, new species. Type.

Upper margin of pectoral but little below axis of body; longest rays two-fifths length of head; ventrals inserted midway between base of caudal and front of posterior nostril; front of dorsal well behind insertion of ventrals, behind middle of trunk a distance equaling half diameter of pupil; caudal forked, its lower lobe recurrent along lower line of caudal peduncle, with well-developed rays which reach to base of anal; vent overlapped by the short ventral fins, and distant from front of anal a distance about equaling length of anal base; adipose fin small, inserted above last anal rays.

The type was in perfect condition when taken, and showed no trace of scales or scale-pouches on the head or body. The lateral line is a wide tube, inclosed by a series of small scales which are wholly embedded and concealed. It does not open through tubes which penetrate the scales, but through minute pores occurring in groups of 3, above and below the scales. Posteriorly the scales diminish in size, and disappear, together with the lateral tube, opposite middle of anal fin.

Color translucent, with faint silvery luster; back a little darker; a Y-shaped blackish mark on occiput and nape; sides of snout and gill-membranes blackish; opercles largely bright silvery; a narrow black crescent around upper and lower contours of eye-ball; a narrow silvery streak anteriorly on each side of median line of abdomen, each streak with an inner line of coarse black specks; caudal peduncle washed with blackish and silvery, this area extending forward to middle of anal, but leaving a narrow translucent area above and below it; peritoneum and lining of opercles largely black; fins largely translucent; caudal a little dusky; anterior anal rays black-punctate at base; ventrals each with a small black basal spot.

Only the type specimen known; possibly captured by the trawl near the surface.

Family STERNOPTYCHIDÆ.

Sternoptyx diaphana Hermann.

Several small specimens were secured, presenting no very wide differences in form or general appearance. One individual differs from all the others in having the 2 frontal ridges converging strongly backward, thus inclosing a narrowly wedge-shaped space. In other cases these ridges are parallel, their terminal spines diverging. Specimens were taken at the following stations: Nos. 3888, off the north coast of Molokai, 809 fathoms; 3904, off north coast of Molokai, 295 fathoms; 3917, off the south coast of Oahu, 294–330 fathoms; 4005, near Kauai, 480–577 fathoms; 4026, near Kauai, 368–1021 fathoms; 4105, Kaiwi Channel, 314–335 fathoms; 4110, Kaiwi Channel, 449–460 fathoms; 4111, Kaiwi Channel, 460–470 fathoms; 4154, near Bird Island, 636–850 fathoms; 4155, near Bird Island, 1164–1594 fathoms; 4166, near Bird Island, 293–800 fathoms.

Polyipnus nuttingi, new species. Plate 73.

Type, 83 mm. long, from station 4088, in the approach to the Pailolo Channel between Molokai and Maui, depth 297 to 306 fathoms; type, No. 51599, U. S. Nat. Mus.

Head 3.3 in length without caudal; depth 1.4; depth of caudal peduncle 8.5; horizontal diameter of eye 7.25; vertical diameter 6.25. D. 15; A. 17; P. 13; V. 7.

Closely resembling in form *P. spinosus* Günther, from the Philippines, and *P. stereope* Jordan and Starks, from Japan, but the posterior half of the body tapers more rapidly and forms a longer, slenderer caudal peduncle. The eye is larger, its horizontal diameter 2.2 in the head. The pair of crests on top of head are higher and very thin, provided with minute subequal spines equally spaced, the posterior 2 of these spines parallel to the others and not specialized. The post-temporals are movably articulated with the cranium, their proximal portions forming 2 slightly diverging ridges behind the occiput, each ridge minutely serrulate and terminating posteriorly in a backwardly directed spine, which is much shorter and weaker than in *P. stereope*. Through the lateral motion of the post-temporals, these spines can be approximated on the mid-dorsal line, or divaricated like the preopercular spines of cottoids. The distal limb of the post-temporal is directed downward and a little forward, its upper portion provided with a serrulate crest. There are no strong accessory spines directed downward and backward from the base of the post-temporal spine, but the serrations at the base of the spine are coarser than elsewhere. The pair of predorsal spines are weaker than in *P. stereope*, and the ridges converge less strongly forward. Both limbs of the preopercle are serrulate and the angle bears a claw-like spine hooked forward, this spine much smaller than in *P. stereope*. Cleft of mouth vertical, tip of mandible a little included; both maxillary and mandible very broad, the inferior mandibular margin serrulate, its angle with a strong triangular spine directed downward and forward; a broad supplemental maxillary bone present, with a smaller scale-like lamella overlying it proximally; premaxillary lying along anterior border of proximal six-tenths of maxillary; premaxillary teeth in a very narrow band or double series, the anterior row directed downward, the others hooked backward; the distal portion of maxillary, where it forms the border of the jaws, bears a similar single or double series of minute teeth; mandibular teeth in a slightly wider band at symphysis, in a single series laterally, those on vomer in 8 or 10 short longitudinal series, which slightly diverge backward; gill-membranes broadly united, free from isthmus; gill-rakers very long and slender, 7 (6 to 8) on vertical limb of outer arch, 15 (14 to 16) on horizontal limb; rows of gill-laminæ much longer than gill-arches; where continued above the latter, they are firmly attached along inner side of shoulder girdle; branchiostegals 9; pseudobranchiæ large.

Front of dorsal fin midway between tip of snout and base of caudal; adipose dorsal low, the length of its base ½ to ⅔ the distance between first dorsal fin and upper caudal rays; origin of anal fin vertically below middle of dorsal, the distance between its last ray and the middle of caudal base equaling the vertical diameter of eye; below and in advance of pectoral base a horizontal serrated ridge, forming the margin of a wing-like expansion of the coracoid; a downwardly directed spine marks the clavicular symphysis; the length of the narrow pectoral fin equals the distance from tip of snout to hinder edge of orbit.

The scales which form the ridge along the breast are more rounded in outline and are thinner than in *P. sterope*, the ridge is lower and the striæ and spines are fewer and weaker; the ridge along each side of abdomen is also much lower.

Dorsal region dark brown, a narrowly V-shaped extension of this color invading the silvery of the anterior part of the sides, extending downward to a point midway between dorsal and ventral profiles; middle of sides silvery, less brillant than in *spinosus* and *sterope*, the abdomen and lower parts generally purplish instead of silvery; base of ventrals and base of outer caudal lobes blackish.

The luminous organs are arranged as in *P. spinosus* and *sterope*, but those above the base of the anal fin are only 11 or 12 in number, and the series is less perfectly continuous, the anterior half being placed at an angle with the posterior half of the series, the sixth spot being decidedly nearer the base of the anal than the seventh; there is also a much wider interval between the anal and the caudal series, where the two are continuous or nearly so; all the photophores are directed downward, and are visible from a point below midventral line; none of them can be seen from the back; on the other hand, the mouth is directed vertically upward and the eyes obliquely upward and outward.

Nothing is definitely known concerning the habits of these fishes. The specimens taken by the *Albatross* were probably captured near the bottom, but their stomachs contained nothing but *Globigerina* and other *Foraminifera*.

The species is named for my friend and associate on the Hawaiian Expedition, Prof. C. C. Nutting, of the University of Iowa.

The relations of *P. nuttingi* to *P. spinosus* and *P. sterope* have been given in the body of the description. *P. spinosus* and *P. sterope* agree with each other in all details of color and form, differing so far as known only in the size of the accessory post-temporal spines. *P. nuttingi* is farther removed from both of these species, differing in the darker coloration of the lower parts, the broader dark area along the back and its longer V-shaped extension below the predorsal region, the arrangement of the anal photophores, the longer, slenderer caudal peduncle, and the weaker spination. In *P. nuttingi*, the accessory spines along the lower edge of the post-temporal spine are reduced to fine serrations.

Polyipnus laternatus Garman (Mem. Mus. Comp. Zool., Vol. XXIV, 1899, p. 238), from the Barbados, is distantly related to these species, having palatine teeth, longer pectoral fins, and widely different form, predorsal blade, and spines. It should be eliminated from this genus. To the synonymy of *P. laternatus*, Garman refers by inadvertence Goode and Bean's figure of *Polyipnus spinosus* (Oceanic Ichthyology, pl. 39, fig. 148). The latter is merely a rough copy (reversed) of Günther's figure of the type of *P. spinosus* (Deep-sea Fishes, Challenger, pl. 51, fig. b), as appears at once on comparison. A number of disconcerting errors have crept into the list of plates and figures given in the Oceanic Ichthyology, so the greatest care must be exercised in referring to these figures. In the explanation of plate 39, fig. 148 is said to be *Argyropelecus olfersii*, while fig. 149 (labeled on the plate *Paralepis coregonoides*) is called *Polyipnus spinosus*. In this instance the names on the plate correspond with their use in the text, and the explanation of the plate should be disregarded.

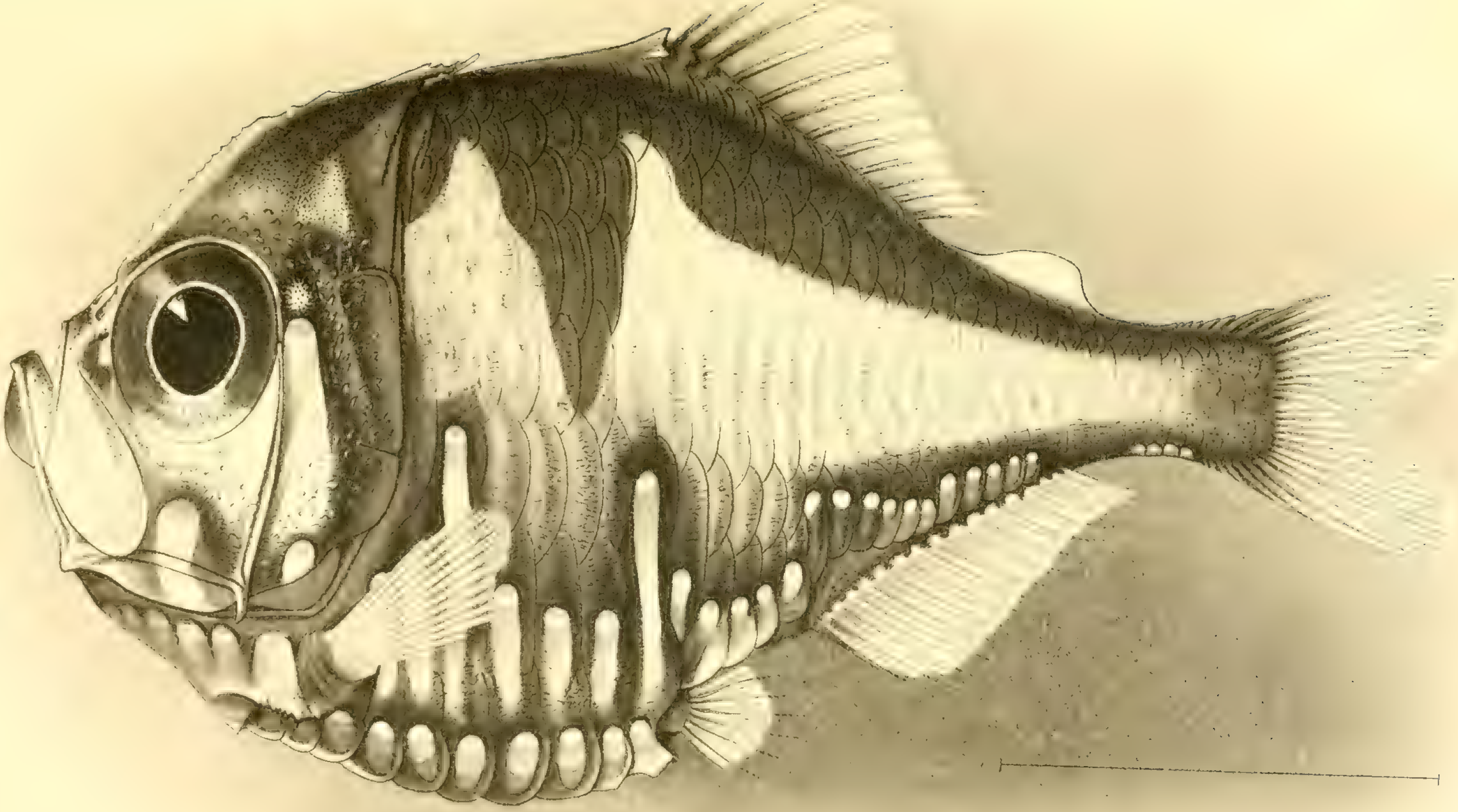
Specimens were taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4090, approach to Pailolo Channel, 304 to 308 fathoms; 4091, approach to Pailolo Channel, 306 to 308 fathoms; 4097, approach to Pailolo Channel, 286 to (?) fathoms; 4121, off the northwest coast of Oahu, 216 to 251 fathoms; 4134, vicinity of Kauai, 225 to 324 fathoms.

Polyipnus spinosus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 416; not of Günther.

Family HALOSAURIDÆ.

KEY TO HAWAIIAN SPECIES OF HALOSAUROPSIS.

a. Snout not produced far beyond the mouth, its preoral length less than one-third its preocular extent.
  b. Vertex gently arched transversely.......................*kauaiensis*, p. 611
  bb. Vertex transversely concave.......................*verticalis*, p. 611
aa. Snout much produced beyond the mouth, its preoral length nearly half its preocular extent.........*proboscidea*, p. 612



POLYIPNUS NUTTINGI GILBERT. TYPE

Halosauropsis kauaiensis, new species. Plate 74.[a]

Type, 655 mm. long, from station 4018, vicinity of Kauai Island, depth 724 to 804 fathoms; type No. 51612, U. S. Nat. Mus.

Length of head 40 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 5; interorbital width 6.5; preocular length of snout 16; preoral length of snout 4; length of maxillary 13; length of mandible 18; greatest depth of body 20; distance from tip of snout to front of dorsal 72; distance from tip of snout to base of ventrals 66; longest pectoral ray 21; longest ventral ray 12. D. 11 (including rudimentary ray); V. 9; P. 14 or 15; enlarged scales between gill-opening and vent 22 to 25; about 35 to 40 scales in a median series from occiput to front of dorsal; branchiostegals 13; gill-rakers 5 + 18 on outer arch; pyloric cæca 9.

Premaxillary band of teeth half length of maxillary band; teeth in both jaws large, arrow-shaped; palatine band tapering to a point anteriorly, and there separated by a very short interval from its fellow; at its posterior end, it is nearly as wide as the premaxillary band, and is separated from the narrower pterygoid band by about .4 its own length; pterygoid band extending far back into the mouth, and very narrow; tongue smooth; a wide band of teeth on the basibranchials; head scaleless, with the exception of the cheeks and a narrow strip above the opercles, which are covered with scales like those on body; vertex gently arched transversely. In adults the gill-rakers are short, the longest about .4 diameter of eye; in the young they are noticeably longer, more than half as long as eye; there are 5 or 6 on the vertical limb and 17 to 19 on horizontal limb of outer arch, including all rudiments.

Origin of the dorsal slightly behind middle of ventral fin, its height a third greater than the length of its base; base of ventrals below eleventh scale of lateral line, and nearer head than vent by two-thirds its own length; its outer ray shortened. In adults the inner ventral rays show union at base only, but in younger individuals they are joined by membrane nearly to their tips. Pectorals long, 1.6 in head, and falling but little short of vertical from base of ventrals; height of longest anal rays equal to half length of snout and orbit.

Scales of lateral line much enlarged. Photophores very narrow, vertically elliptical.

Color dark brown on back and sides, many of the scales with a light pearly spot at base; under parts, including snout, sides of head and subpectoral region and gill cavity, blue-black; ventrals blue-black; pectorals and dorsal dusky at base, whitish on terminal portion; anal dusky, lighter at base. Young specimens have a black vertebral band behind dorsal fin.

Taken at the following stations: Nos. 3887, off the north coast of Molokai, 552 to 809 fathoms; 3977, vicinity of Bird Island, 876 to (?) fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4019, vicinity of Kauai, 409 to 550 fathoms.

H. kauaiensis is most nearly related to *H. mediorostris* (Günther) from near the Philippine Islands, but the scales are much larger in the latter.

Halosauropsis verticalis, new species. Plate 75.[b]

Type, 295 mm. long, from station 4141, vicinity of Kauai, depth 437 to 632 fathoms; type, No. 51645, U. S. Nat. Mus.

Length of head 46 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 8; interorbital width 6; preocular length of snout 20; preoral length of snout 7; length of maxillary 16; length of mandible 20; greatest depth 15; distance from tip of snout to front of dorsal 77; distance from tip of snout to base of ventrals 72; longest pectoral ray 28; longest ventral ray 13. D. 11 (including anterior rudiment); V. 9; P. 14; enlarged scales between vent and gill-opening 25; about 40 to 45 scales on median line of back before dorsal fin; branchiostegal rays 12; gill-rakers 6 + 18 on outer arch, the longest two-thirds diameter of eye; pyloric cæca 9.

The greatest depth is at occiput, one-third length of head; snout longer than in *H. kauaiensis;* horizontal diameter of eye slightly exceeding interorbital width, equal to .3 the postocular part of the head ($\frac{1}{3}$ in *kauaiensis* of equal size, in which it exceeds interorbital width by .2 its length); occiput deeply concave, sending forward a narrow concave groove which tapers to a point and thus terminates slightly in front of nostrils; outlines of the brain very conspicuously marked on the occiput; maxillary extending slightly beyond anterior margin of orbit; premaxillary constituting slightly less than .4 of the dentary surface of the upper jaw; teeth distinctly arrow-shaped, constricted at a point below tip, then broadened; palatine bands with a straight inner and a convex outer margin, tapering from the middle toward either end; their greatest width equals that of the premaxillary bands; their anterior ends are separated by a distance about equaling one-fourth their length; pterygoid bands much narrower and longer, and separated by a narrow interspace from palatine bands; tongue smooth, basibranchials toothed as usual.

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[a] *Aldrovandia kauaiensis* on plate, by error.

[b] *Aldrovandia verticalis* on plate, by error.

With the exception of the cheeks and a narrow area above the opercles, the head is scaleless.

Origin of dorsal over middle of ventral fin; base of ventral fins below the thirteenth enlarged scale, and nearer head than vent by about half length of fin; outer ventral ray simple, shortened, and closely adnate to the second; the inner rays of the 2 ventrals joined by membrane, which apparently extends to their tips; pectorals very long, reaching somewhat beyond front of dorsal fin; longest anal rays half as long as snout.

Color brownish black on back and sides, with a black vertebral streak behind dorsal fin; head, belly, and lower parts generally a deep blue-black, as is also the lining of mouth and gill-cavity; fins dusky translucent; photophores borne beneath a series of much enlarged scales.

This species is very close to *H. kauaiensis*, but differs in the concave vertex, the longer snout and the differing proportions.

Taken at the following stations: Nos. 3985, vicinity of Kauai, 430 to 477 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4151, vicinity of Bird Island, 313 to 800 fathoms.

Halosauropsis proboscidea, new species. Plate 76.[a]

Type, 422 mm. long, from station 4111, Kaiwi Channel, between Molokai and Oahu Islands, depth 460 to 470 fathoms; type, No. 51614, U. S. Nat. Mus.

Length of head 35 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 6; interorbital width 3.5; preocular length of snout 15.5; preoral length of snout 7; length of maxillary 9.5; greatest depth of body 15; distance from tip of snout to front of dorsal 71; distance from tip of snout to base of ventrals 67; longest pectoral ray 21; longest ventral ray 12. D. 11 (including anterior rudiment, the last ray cleft to the base, destroyed in the type); V. 9; P. 14; enlarged scales between vent and gill-opening 29; gill-rakers 4 + 11 on outer arch, several of the anterior being tubercular rudiments, the longest half the diameter of the eye; pyloric cæca 8.

The opercular margin is slightly nearer base of ventrals than tip of snout; snout very long as in *H. rostrata* (Günther) and *H. affinis* (Günther); middle of pupil occupying middle of length of head; horizontal diameter of the eye 0.3 postocular length of head; interorbital space very narrow, its width contained 1.4 in the ocular diameter; occiput and interorbital space flat or gently convex; maxillary extending slightly beyond anterior margin of orbit, its length 3.8 in head; premaxillaries constituting 0.3 the dentary surface of upper jaw; teeth showing a slight constriction below tip, the latter flattened but not widened; palatine bands crescentiform, the 2 fully confluent anteriorly on the median line, wider than the premaxillary bands, and tapering but little anteriorly; pterygoid bands very narrow and separated from the palatines by an interspace half the length of palatine band; tongue smooth, basibranchials with a wide band of teeth; head naked, except the usual scaly area on cheeks and above opercles.

Origin of dorsal fin but a little behind root of ventrals; base of ventrals below seventeenth enlarged scale, and nearer vent than head by half the orbital diameter; outer ventral ray shortened and adnate, the inner rays of the 2 fins united by membrane, at least in the smaller cotype; pectorals long, equaling length of snout and eye, but falling far short of base of ventrals.

Color light grayish brown, with a faint bluish tinge; a blue vertebral streak behind dorsal fin; head and a narrow streak along belly and lower side of tail blue-black, as are also the mouth and gill-cavity; dorsal, pectorals, and ventrals only faintly dusky.

Photopores connected with a series of much enlarged scales.

A young specimen, 200 mm. long, considered a cotype, differs from the type in being everywhere jet-black, and in having the ventrals inserted a little farther forward, so that the origin of the dorsal is over the middle of their length, and their base is slightly nearer head than vent. In this specimen the gill-rakers are also 4 + 11; the branchiostegal rays 11.

H. proboscidea is closely related to *H. affinis* (Günther), from south of Japan, but has a longer, narrower head, with much narrower orbital space and more posteriorly inserted ventrals. It differs also in the anterior confluence of the palatine bands of teeth.

Specimens were taken at stations Nos. 4111, Kaiwi Channel, 460 to 470 fathoms, and 4138, vicinity of Kauai, 438 to 476 fathoms.

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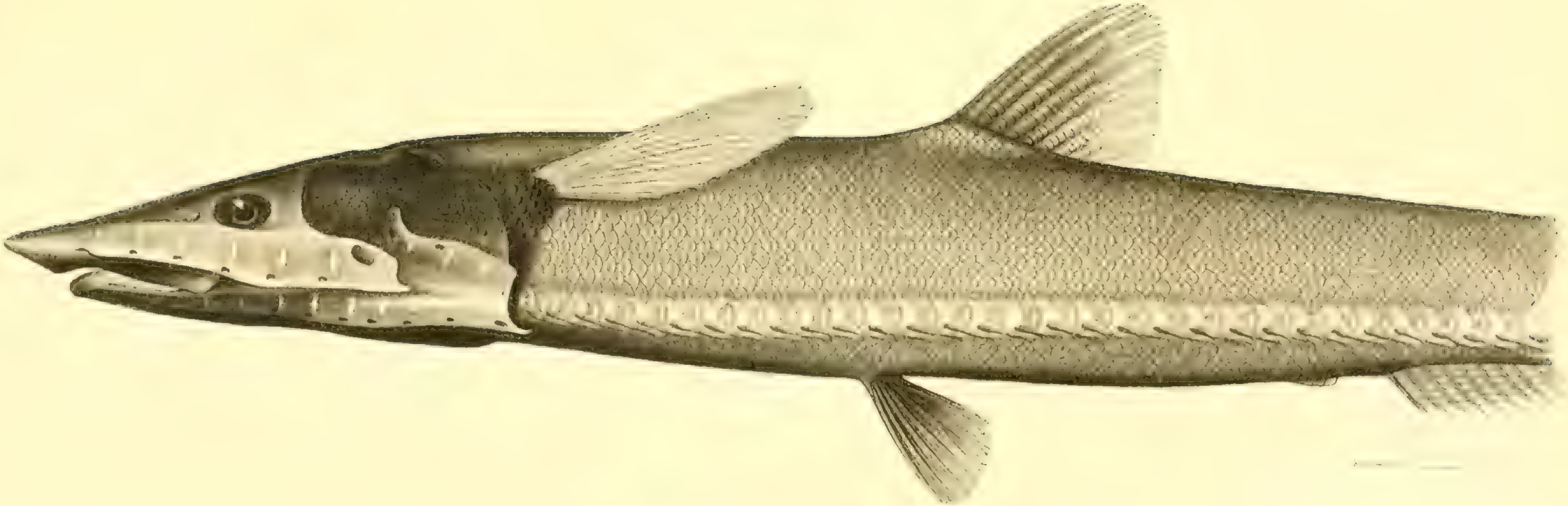
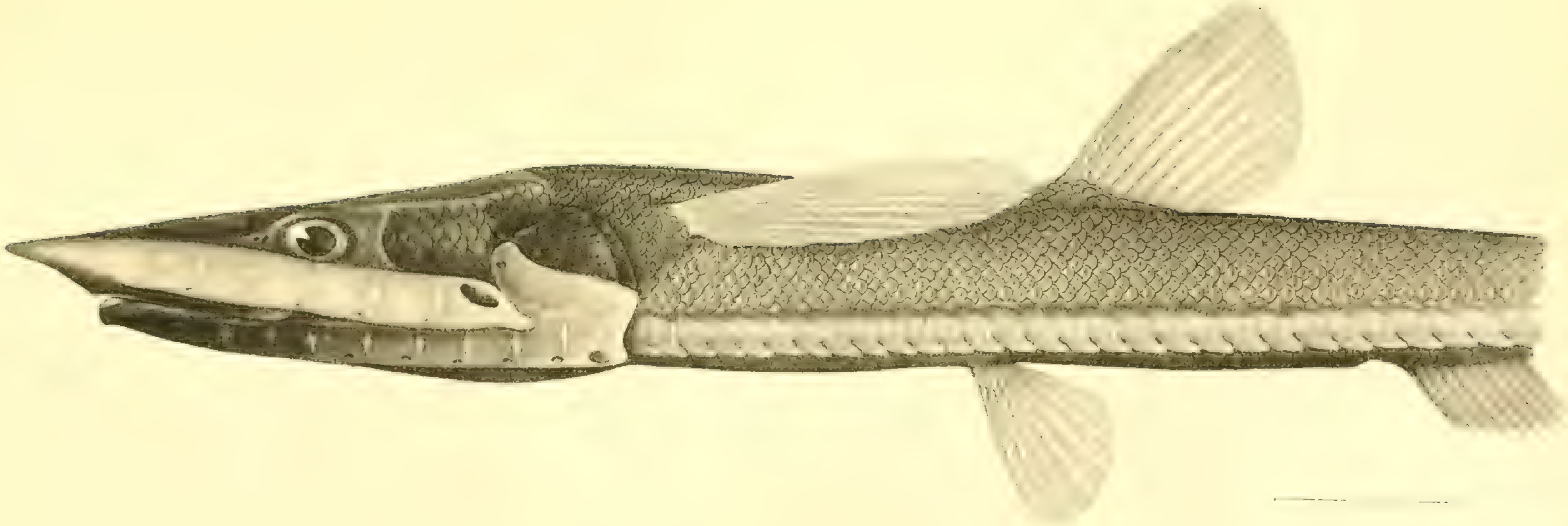
[a] *Aldrovandia proboscidea* on plate, by error.

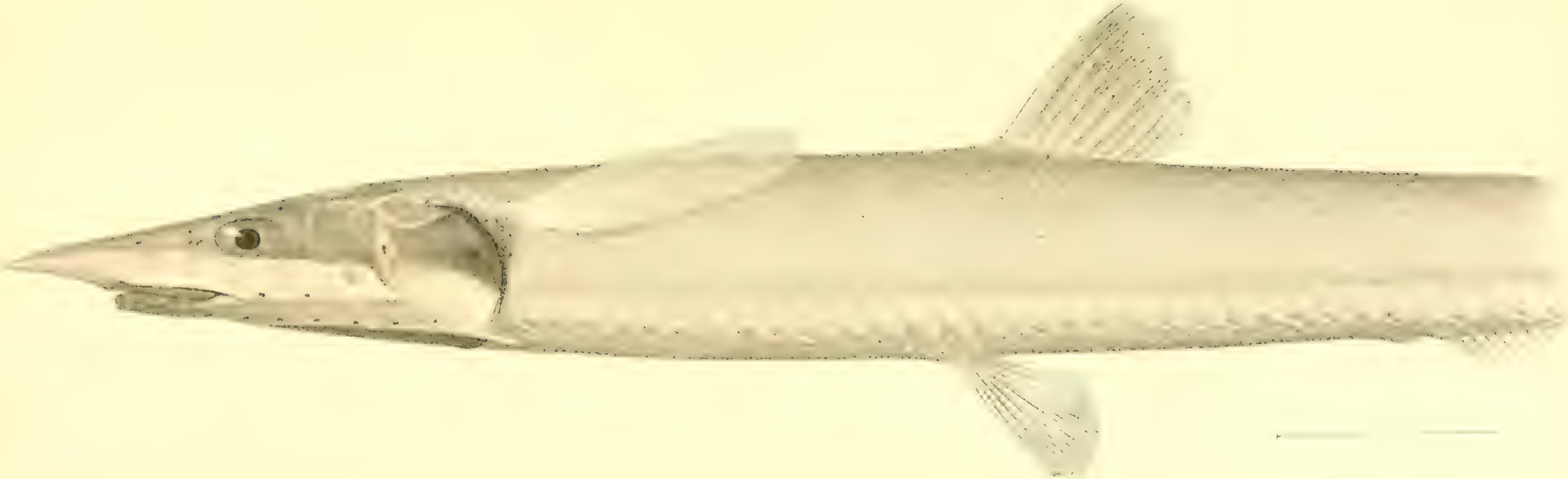


ALDROVANDIA KAUAIENSIS GILBERT. TYPE.



ALDROVANDIA VERTICALIS GILBERT. TYPE

JULIUS BIEN & CO. LITH. N.Y.



ALDROVANDIA PROBOSCIDEA GILBERT. TYPE.

Family MACRORHAMPHOSIDÆ.

Macrorhamphosus hawaiiensis, new species. Fig. 237.

Type, 42 mm. long, from station 3940, near Laysan Island, depth 59 to 70 fathoms; type, No. 51618, U. S. Nat. Mus.

Length of head 49 hundredths of total length to base of caudal; length of snout 28; diameter of orbit 8; interorbital width over middle of eye 7; greatest depth of body 22; distance from tip of snout to dorsal 68; length of second dorsal spine 23; base of second dorsal 6. D. v–12; A. 18, the last ray cleft to the base; P. 15.

Most nearly related to *M. japonicus* (Günther) and *M. gracilis* (Lowe), the form more slender than in *M. scolopax* (Linnæus) or *M. sagifue* Jordan & Starks, the dorsal spine with very small spinelets along its posterior edge, perhaps smooth in adults; predorsal plate broader and less compressed than in *M. sagifue*, and top of head covered with coarser scales, the crests of which form sharply marked ridges; second dorsal spine compressed and strongly ridged, its tip reaching middle of soft dorsal, its length two-fifths the distance from gill-opening to base of caudal; in a smaller cotype, 25 mm. long, the spine reaches the second or third soft dorsal ray; ridges on top and sides of head show little or no trace of serration.

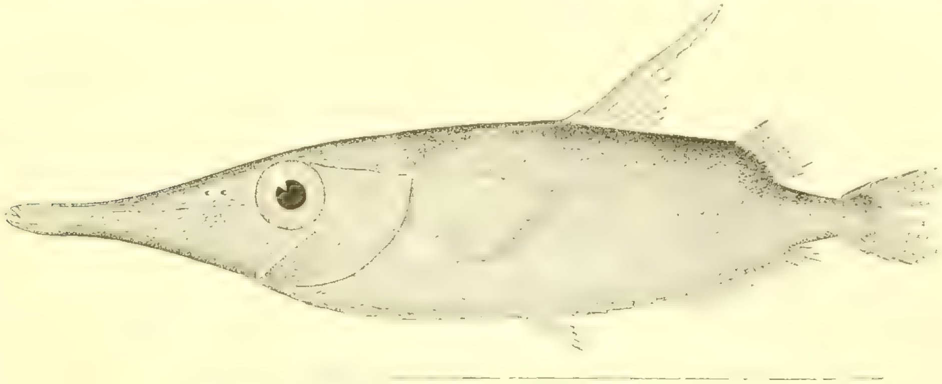


FIG. 237.—*Macrorhamphosus hawaiiensis* Gilbert, new species. Type.

Color dark slate on back and top of head, bright silvery elsewhere.

Two specimens known from station 3940.

Family SYNGNATHIDÆ.

Ichthyocampus erythræus, new species. Fig. 238.

Type, 55 mm. long, from station 3847, taken with the tangles at a depth of 23 to 24 fathoms off the south coast of Molokai; type, No. 51548, U. S. Nat. Mus.

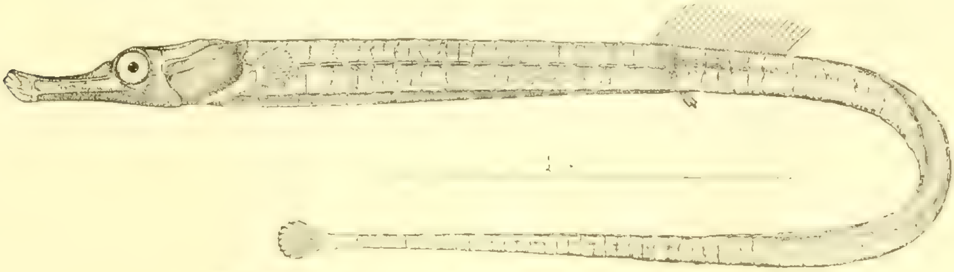


FIG. 238.—*Ichthyocampus erythræus* Gilbert, new species. Type.

Head 23 hundredths of total length; snout 6; head and trunk 38; base of dorsal 8. Dorsal with 22 rays, beginning at the anterior margin of the ring containing the vent, and continued on 5½ rings; pectorals with 14 rays, caudal with 6; rings 16 + 36, the anal ring enumerated with those of the trunk.

Snout short, compressed, with a thin low median crest in its proximal two-thirds, the edge of the crest minutely serrate; supraorbital rim elevated, shelving outward, continued backward and a little downward behind orbit as a wing-like ridge; occiput with a low median crest, which is not continuous, with a similar short nuchal ridge; a strong ridge along upper margin of opercle; trunk with 7 ridges—a pair of dorsal ridges, a corresponding pair of ventral ridges, a well-defined ridge along middle of each lateral face, and a low rounded mid-ventral ridge; the mid-ventral and the lateral ridges cease at anal ring, the other 4 continue on tail; all ridges are sharp, the faces between them concave; pectorals and caudal very short; a small anal with 5 rays developed immediately behind vent.

Color in life brick-red, the dorsal face crossed by 13 narrow greenish cross-bars, each narrower than one ring; a row of pearly spots along the pair of ventral ridges, one between each 2 plates.

Family PEGASIDÆ.

Pegasus papilio, new species. Fig. 239.

Type, 47 mm. long, from station 4149, near Bird Island, depth 33 to 71 fathoms (captured with the tangles); type, No. 51549, U. S. Nat. Mus.

Length of head 35 hundredths of total length without caudal; greatest depth 20; greatest width at base of pectorals 45; at axil of pectorals 30; distance from vent to base of caudal 41; length of snout 18; width at middle of snout 3; length of maxillary 5; diameter of eye 8; width over middle of eye 12; longest pectoral ray 41; longest ray of caudal 21; distance from front of dorsal and anal to base of caudal 33. D. 5; A. 5; P. 11; V. 2; C. 8; tail with 8 rings.

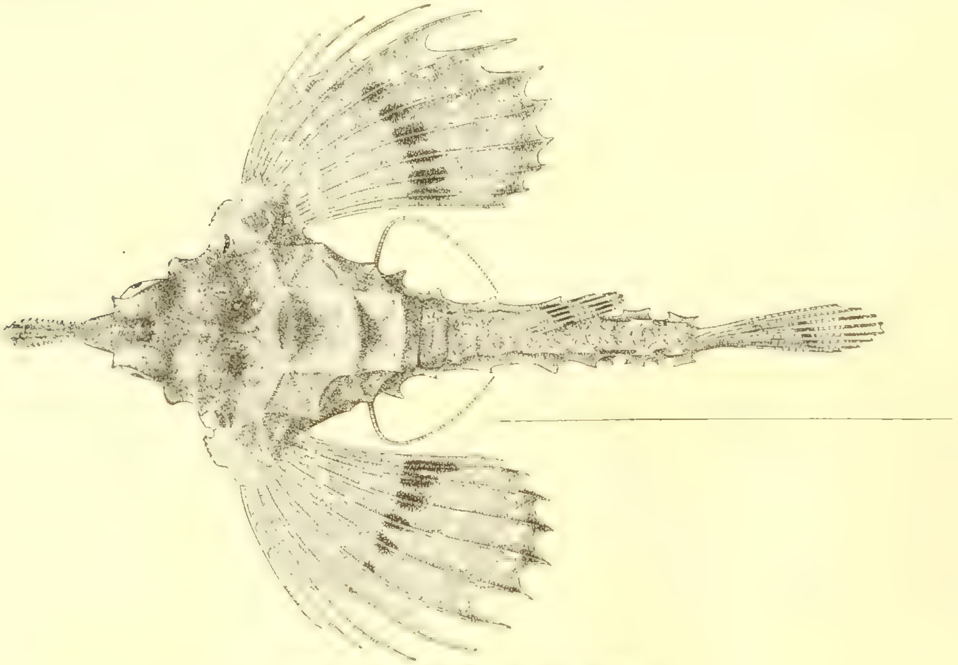
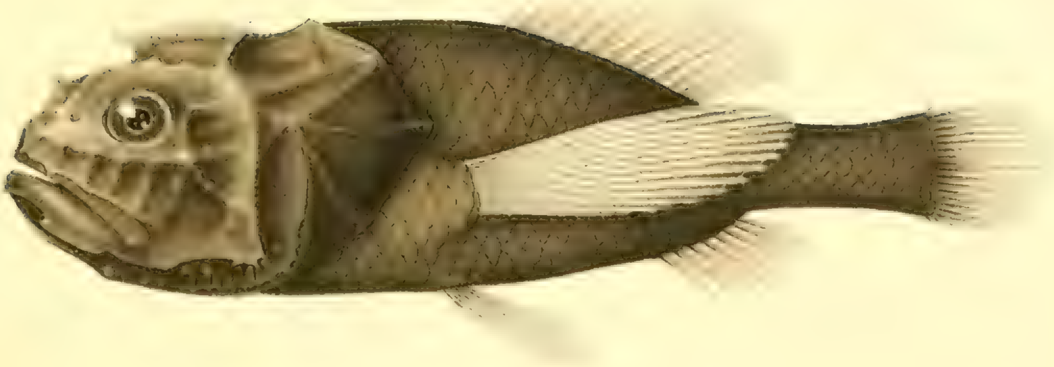
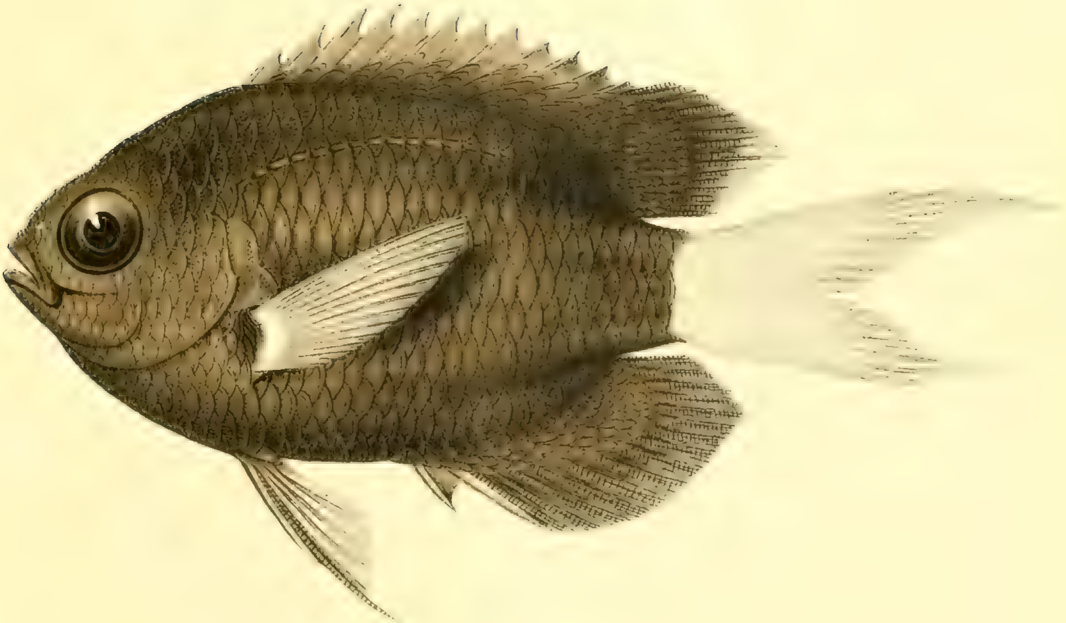


FIG. 239.—*Pegasus papilio* Gilbert, new species. Type.

Snout very long and slender, directed obliquely upward and forward at an angle of about 45° with the axis of the body; of approximately equal width throughout, and square in cross-section, each of the lengthwise ridges provided with a series of coarse retrorse spines; mouth toothless, very oblique,



1. MELAMPHAES UNICORNIS GILBERT. TYPE.



2. CHROMIS LEUCURUS GILBERT. TYPE

having the same inclination as snout; interorbital space and occiput concave; supraorbital ridges elevated; a median and a pair of lateral conical tubercles on occiput; immediately behind occiput a pair of small pit-like depressions; behind these 4 longitudinal and 3 cross-ridges, their intersections tubercular and almost spinous, the intervening spaces concave; tail abruptly constricted behind disk; 8 caudal rings, quadrate in cross-section, the angles bearing sharp backwardly-directed spines; the last 2 or 3 rings bearing horizontal ridges at the angles, with spines at either end; on middle of sides of tail are 4 small intercalated plates, each bearing a spine directed backward, the anterior pair much smaller than the posterior; these plates alternate with those forming the angles of the tail, and are located in the intervals between first and second, second and third, fourth and fifth, and fifth and sixth plates; a strong spine directed backward on median dorsal line at base of caudal fin; and a similar smaller one below; dorsal and anal fins inserted on the second, third, and fourth caudal rings, and of equal size and opposite.

In life the head and body is olivaceous above, finely spotted with pearly white and mottled with light red; 3 indistinct double cross-bars of light red behind the pectorals, those on tail meeting below. Pectorals finely spotted with white; across middle of pectoral a wide dark reddish brown band, widest on inner rays, appearing black in spirits; near their tips, the rays are crossed with reddish brown. Dorsal barred with reddish chocolate and white; basal half of caudal rays spotted with reddish, distal half with brown, intermediate area white.

Other specimens were yellowish olive, with irregular reticulations of bright orange-red; tail barred with orange-red, the under parts pearly white; minute white spots on head, body, and pectoral fins, the latter spotted and barred with orange-red, but the blackish brown cross-band of the type very inconspicuous or wanting; caudal with 3, dorsal with 2 reddish cross-bars.

The species was taken at the following stations: Nos. 4061, off the northeast coast of Hawaii, 24 to 83 fathoms; 4149, near Bird Island, 33 to 71 fathoms; 4164, near Bird Island, 40 to 56 fathoms.

Family BERYCIDÆ.

Melamphaës unicornis, new species. Plate 77, Fig. 1.

Type, 31 mm. long, without caudal fin, from station 4142, in the vicinity of Kauai, at a depth of 632 to 881 fathoms; type, No. 51517, U. S. Nat. Mus.

Length of head 41 hundredths of total length without caudal; width of head 15; interorbital width 10; diameter of eye 6; length of snout 13; length of maxillary 19.5; distance from snout to hinder edge of occiput 30; to front of dorsal 55; to front of anal 69; to base of ventrals 46; length of base of dorsal 25; base of anal 10; length of pectorals 34; length of ventrals 19; greatest depth 30; least depth of caudal peduncle 8; length of free portion of caudal peduncle 21.5. D. II, 12; A. I, 8; P. 14; V. I, 7; scales in lateral line 25.

Head very long, comparatively narrow; interorbital space narrow, less than twice the diameter of the small eye; snout long, high, and compressed, its anterior profile gently decurved; mouth moderately oblique, the maxillary falling a very little short of the vertical from the hinder margin of the orbit; mandible closing within the premaxillaries, but the symphysis produced into a short projecting acute tip; teeth minute, subequal, in a single, somewhat irregular series in the mandible; in 2 distinct rows, separated by an interval, in the premaxillaries; cephalic crests well developed, their margins usually finely spinous; a conspicuous pair bound the occiput, which forms thus a deep narrow groove with parallel sides; the spines on these occipital crests increase in length anteriorly and become inclined obliquely forward; a slender horn-like spine arising from middle of snout above nostrils, and directed nearly vertically upward; mandibular rami broadly winged along their outer and their inner margins, the inner meeting below to form a crest; preorbital not produced; preopercle forming a thin membranaceous structure, crossed by many transverse slender ridges, each ending in a delicate marginal spine; posterior border nearly vertical, the angle broadly rounded; two slender spines at lower posterior angle of cheek; opercle extremely thin and flexible, its margin without spines or serrations, marked by 4 ridges diverging from a common center, the lowermost nearly vertical, parallel with preopercular margin; gill-rakers slender, lanceolate, somewhat expanded, leaf-like, overlapping at base, with a few slender denticles on inner margin, 8 + 15 in number on outer arch; hinder edge of occiput equidistant between front of dorsal and nostril; origin of anal fin under the fifth dorsal ray before the last; free portion of caudal peduncle equal to interval between base of ventrals and front of anal; ventrals inserted in advance of pectorals, which are inserted low; pectorals very slender, and extending nearly to middle of caudal peduncle; first 2 dorsal rays apparently spinous, but the third very distinctly articulated; one anal spine, which is compressed and rather long.

The scales have nearly all fallen.

Color, head jet-black; trunk, being partly denuded, appears light grayish or brownish, but was probably black in life, less intense than head; a distinct black bar at base of caudal, fins otherwise light, or only slightly dusky; body cavities lined with black.

A second specimen, 20 mm. long, without caudal, agrees with the type in fin-rays, scales, measurements, and color. The short median spine on snout is present.

The species was taken at stations Nos. 4005, vicinity of Kauai, 480 to 577 fathoms, and 4142, vicinity of Kauai, 632 to 881 fathoms.

Caulolepis longidens Gill.

A single specimen, 121 mm. long, taken at station 4155, near Bird Island, at a depth of 1,164 to 1,594 fathoms, agrees closely with the figure and description of the type given by Goode and Bean (Oceanic Ichthyology, p. 184, fig. 204), and with the description by Gilbert (cited below) of a specimen from the coast of California. With the exception of a slightly smaller eye, and a slightly shorter dorsal and anal (1 less ray in each fin), no differences have been detected.

Caulolepis subulidens Garman (Mem. Mus. Comp. Zool., vol. 24, 1899, p. 60, pl. B), from the Pacific coast of Panama, seems to be distinguished by important characters. According to the figure, the depth at front of dorsal is decidedly less than at occiput, and the profile along base of dorsal is nearly straight; the ventrals are more anteriorly inserted and the space between ventrals and anal much longer; the premaxillary bone is produced posteriorly into a long slender process, which extends well beyond the broadly rounded end of the maxillary.

Length from tip of snout to base of caudal 101 mm.; greatest depth of body 50 hundredths of this length; least height of tail 10.5; length of head (to tip of preopercular spine) 38; greatest width of head 18; interorbital width 12; length of snout 12; length of maxillary 33; length of mandible 33; diameter of orbit 7; distance from tip of snout to dorsal 51; base of dorsal 41; distance from tip of snout to anal 74; base of anal 8.5; distance from pectoral to snout 37; from ventral to snout 49.5. Dorsal 18; anal 8; pectoral 15; ventral 7; 14 disks along the course of lateral line; about 12 scales in an oblique line downward and backward from origin of dorsal fin to lateral line.

Caulolepis longidens Gill, Proc. U. S. Nat. Mus., VI, 1884, p. 258, Atlantic coast of the United States; Gilbert, Proc. U. S. Nat Mus., XXI, 1898, 565, coast of southern California.

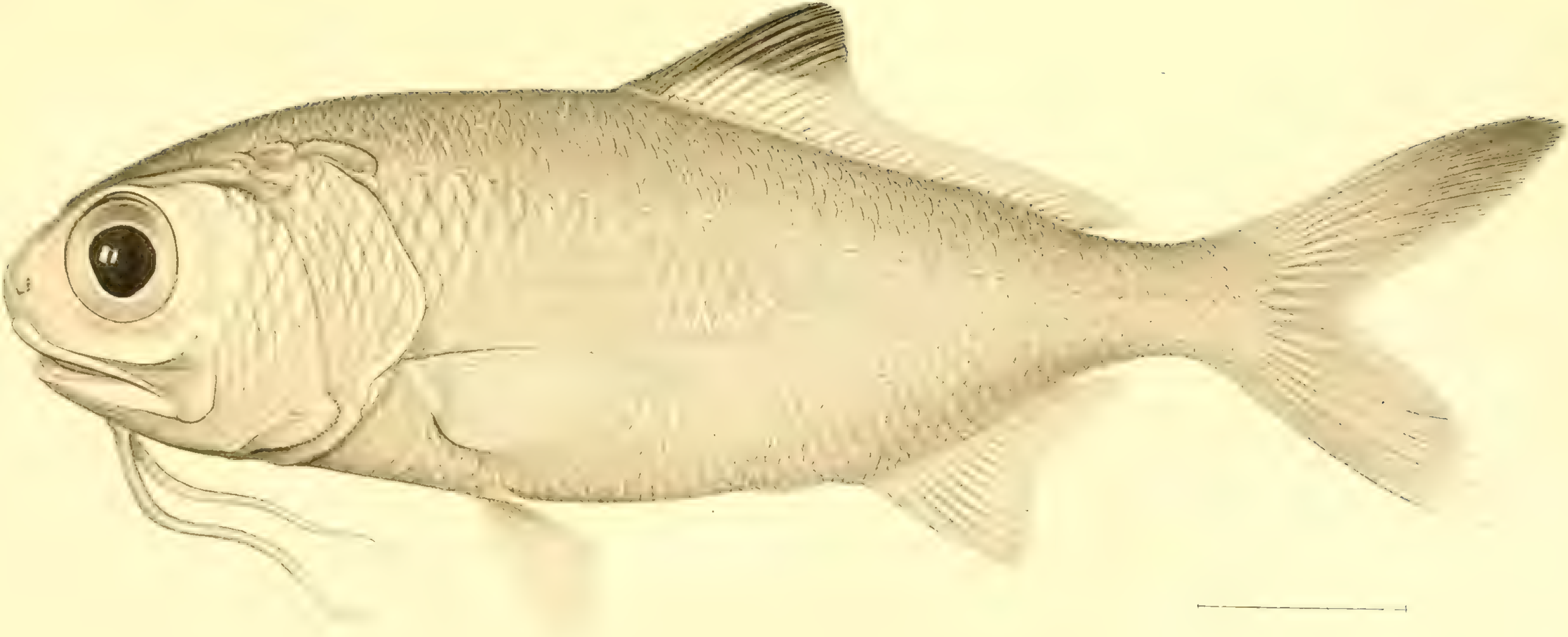
Family POLYMIXIIDÆ.

Polymixia berndti, new species. Plate 78.

Type, 186 mm. long, from the Honolulu market; cotype from station 4115, off the northwest coast of Oahu, depth 195 to 241 fathoms; type, No. 51607, U. S. Nat. Mus.

Length of head 36 hundredths of total length without caudal; diameter of orbit 12; interorbital width 10; length of snout 7.5; length of maxillary 20; length of barbels 27; depth of body 33; least depth of caudal peduncle 9; length of pectoral 23; length of ventral 13.5; longest ray of upper caudal lobe 24; base of dorsal 38; length of fifth dorsal spine 8.5; length of first soft dorsal ray 17.5; length of fourth anal spine 8.5; base of anal 18. D. v, 30; A. iv, 17; P. 16 or 17; V. 7; lateral line with 35 or 36 pores, 5 scales in a vertical series between lateral line and front of dorsal, 13 or 14 between lateral line and front of anal.

Form much more slender than in *P. japonica* Günther; snout bluntly rounded, protruding beyond premaxillary teeth, its apex on a level with nostrils; nostrils small, pore-like, the anterior slightly larger, located midway between apex of snout and front of orbit; snout protruding beyond the premaxilla an axial distance about equaling one-sixth its length; snout covered with soft integument, in which are ramifications of the sensory canals; barbels reaching to below pectoral base, equaling length of head anterior to preopercle; maxillary extending well beyond vertical from hinder margin of orbit; its supplemental bone forms nearly half the extreme width of its dilated posterior portion, being much wider than in *P. japonica;* teeth minute, arranged as in other species, but in very



POLYMIXIA BERNDTI GILBERT TYPE

broad bands; both upper and lower margins of suborbital bones, preopercle, and suboperele minutely serrated; gill-rakers long, 4 + 9 in number; anterior portion of dorsal fin sharply falcate, longest ray twice length of fifth spine; ventrals extending but halfway to vent; upper caudal lobe apparently longer than lower.

Scales much larger than in *P. japonica*, although the number of pores in the course of the lateral line is about the same. Snout and a narrow strip along each superior orbital rim scaleless, the scales forming an uninterrupted wedge-shaped extension forward on middle of interorbital space; an oblique line running backward from above middle of orbit contains 7 scales; a low sheath of scales along base of dorsal and anal fins, consisting of a single series along anterior portion of base of each fin; caudal scaled in the greater part of its length.

Color, back olivaceous, anteriorly with the distal portion of each scale largely dusky, posteriorly each scale with a black intramarginal line; lower half of sides and belly bright iridescent-silvery; opercles dusky; mouth and gill-cavity white; peritoneum blackish; fins translucent, the anterior dorsal lobe with a black tip, which is continued forward as a narrow margin over the spinous portion of the fin; terminal part of upper caudal lobe blackish.

I take pleasure in naming this species for Mr. Louis E. Berndt, market inspector in Honolulu, to whose kind assistance the expedition owed much of its success. The type of the present species was secured for us by Mr. Berndt in the Honolulu market. It was not recognized by the fishermen, and doubtless lives at greater depths than the market fishes. The single cotype was taken at station 4115, off the northwest coast of Oahu, depth 195 to 241 fathoms.

Family BRAMIDÆ.

Collybus drachme Snyder.

Taken at station 4176, near Niihau, 537 to 672 fathoms. The type of this species certainly entered the trawl at or near the surface.

Family APOGONICHTHYIDÆ.

Amia maculifera (Garrett).

Station 3875, in channel between Maui and Lanai, in 34 to 65 fathoms.

Foa brachygramma (Jenkins).

Stations Nos. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3849, south coast of Molokai, 43 to 73 fathoms; 3872, channel between Maui and Lanai, 32 to 43 fathoms; 3873, channel between Maui and Lanai, 32 to 37 fathoms; 3875, channel between Maui and Lanai, 34 to 65 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms.

Mionorus waikiki (Jordan & Evermann).

Stations Nos. 3872, channel between Maui and Lanai, 32 to 43 fathoms, and 3876, channel between Maui and Lanai, 28 to 43 fathoms.

Hynnodus, new genus.

Like *Epigonus*, but the palatines with teeth, and the body much more elongate; 2 anal spines; minute teeth in jaws and on vomer and palatines; all the bones of head unarmed except the opercle, which bears a single spine; eyes very large; tubes of lateral line very large, each scale perforated by a canal which opens on the outer surface beneath an antero-posterior bridge, on the dorsal and ventral side of which are wide external pores.

Epigonus occidentalis Goode and Bean may be a member of this genus, although it is said to have the vomer and palatines toothless.

Hynnodus Gilbert, new genus of *Apogonichthyidæ* (*atherinoides*).

Hynnodus atherinoides, new species. Plate 79.

Type, 117 mm. long, from station 3867, Pailolo Channel, depth 284 to 290 fathoms; type, No. 51601, U. S. Nat. Mus.

Head 31 hundredths of the total length to base of caudal; greatest depth 15; least depth of caudal peduncle 7.5; length of snout 7; diameter of orbit 14; length of maxillary 11.5; interorbital width 6; greatest width of head 16; distance from tip of snout to ventrals 33; to front of dorsal 36; distance between dorsals 12. D. VII–I, 10; A. II, 9; V. I, 5; P. 22 or 23. Scales in the lateral line 54; gill-rakers 6+16; branchiostegals 7.

Body extremely elongate, occiput depressed, broader than deep; snout and interorbital space flattish above, orbital rims not noticeably raised; mouth terminal, oblique; lower jaw included; maxillary in part slipping under the very narrow preorbital, not reaching vertical from front of pupil; teeth very small, slightly curved, in single series in jaws and on palatine bones, in a patch on head of vomer; tongue smooth; posterior nostril a transverse slit in front of upper part of orbit; the anterior a wide pore with raised margins, directed forward, slightly nearer eye than tip of snout; preopercle forming a narrow projecting rounded lobe at angle, but not striate; interopercle expanded below to form a very thin projecting lamina; opercle bearing a single strong spine, all other bones of head unarmed; 4 gills, with a slit behind fourth arch; pseudobranchiæ very large; gill-rakers long and slender, 6+16 in number, the longest one-third length of maxillary.

Dorsal spines slender, the first very short, about one-eighth length of second; a definite well-developed spine at beginning of second dorsal; first anal spine less than one-third length of second; all the spines strongly compressed. As the margins of all the fins are mutilated, their shape can not be given.

The scales of lateral line persist, but all others have fallen. The extent to which the head was covered can not be ascertained.

Color dark gray, darker along margins of scales; snout blackish; dorsals and anal dusky; mouth light, but the gullet, branchial chamber, and peritoneum jet-black; opercles appear blackish externally.

Two specimens were taken at station 3867.

Synagrops argyrea (Gilbert & Cramer).

A rare species, but 8 specimens secured. The original account of the species may be corrected as to the following details: Depth of body 3.5 in total length without caudal; least depth of caudal peduncle 2.7 in depth of body; eye averages a little smaller, being contained 3.3 to 3.4 in head; a distinct slender supplemental maxillary bone; each ramus of lower jaw usually containing only 4 (rarely 5) canines, instead of 7 as in type; upper end of base of pectoral on a level with lower margin of orbit.

Taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3920, off the south coast of Oahu, 280 to 265 fathoms; 4084, off the north coast of Maui, 253 to 267 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms.

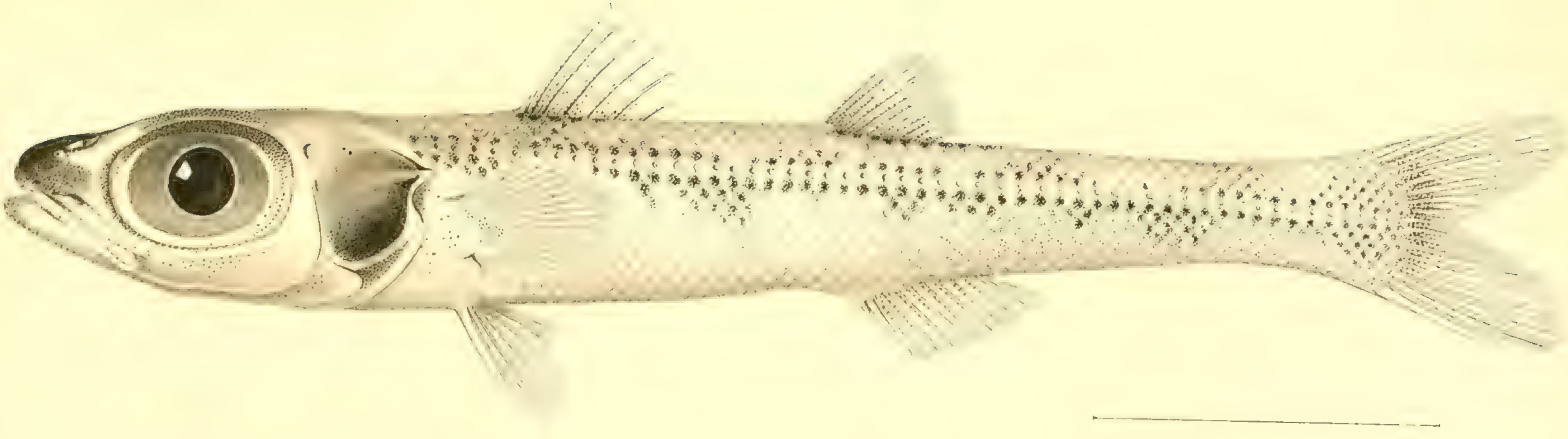
Melanostoma argyreum Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 416, pl. 39, fig. 3.

Family SERRANIDÆ.

Grammatonotus, new genus.

Closely allied to *Callanthias*, differing in having but one opercular spine, in the presence of large pores on the head, and in the tubular anterior nostril; the canines are greatly reduced in size, and the snout is not scaled in front of the eye; lateral line single, running along base of dorsal fin, ending under last ray; scales large, minutely ctenoid, rough; dorsal fin continuous, not notched; soft dorsal and anal with middle rays produced into pointed lobes; ventrals very close together, with one spine and 5 rays, the outer ray longest; preopercle entire; opercle with a single pungent spine; gill membranes narrowly united, with 6 rays.

Grammatonotus, Gilbert, new genus of *Serranidæ* (*laysanus*).



Hynnodus atherinoides Gilbert Type

Grammatonotus laysanus, new species. Fig. 240.

Type, 38 mm. in total length without caudal, from station 3947, near Laysan Island, depth 97 to 199 fathoms; type, No. 51546, U. S. Nat. Mus.

Head 35 hundredths of total length without caudal; length of snout 5; length of maxillary 15; diameter of orbit 15; interorbital width 10; greatest depth of body 32; least depth of caudal peduncle 17; length of caudal peduncle 21; length anterior to dorsal fin 38; base of dorsal 47; longest dorsal spine 15; longest dorsal ray 23; length of third anal spine 13; longest anal ray 23; longest pectoral ray 25; ventrals 27. D. XI, 8; A. III, 9; P. 19; V. I, 5. Tubes in lateral line 18; transverse rows of scales between upper end of gill-opening and base of caudal 25 or 26; scales in an oblique row between point of dorsal and vent, 10 or 11.

Caudal peduncle short and deep, more than half greatest depth of body; snout very short, evenly rounded, transversely convex, as is also the interorbital space and occiput; anterior nostril with a short broad tube, in front of eye; posterior nostril a small round pore widely separated from the anterior, located on upper orbital rim but little in advance of pupil; eye very large, three-sevenths length of head; mouth oblique, short, maxillary narrow, not reaching vertical from middle of eye; suborbitals very narrow, not concealing maxillary; in sides of premaxillaries a narrow band of fine villiform teeth and an outer series of small canines, the anterior 1 or 2 teeth of outer series a little enlarged; a deep notch between premaxillary teeth anteriorly; mandible with a single series of teeth similar to outer premaxillary teeth, 1 or 2 of anterior teeth slightly enlarged; a few minute teeth on head and shaft of vomer, and on front of palatines; preopercle rounded, with entire margin; opercle with a horizontal rib ending in a single pungent spine; clavicles forming a sharp keel below on median line, embracing posterior part of isthmus and region immediately posterior; gill-membranes narrowly united anteriorly, forming a free fold across isthmus; branchiostegal rays 6; pseudobranchiæ large; gill-laminæ narrow, the anterior set of filaments on first arch and the posterior set on fourth arch shortened; a well-developed slit behind fourth arch; twenty long slender gill-rakers on horizontal portion of outer arch, the longest two-sevenths diameter of orbit; a series of large pores on mandible, and one extending from sides of snout around posterior half of orbital rim, and on suborbitals.

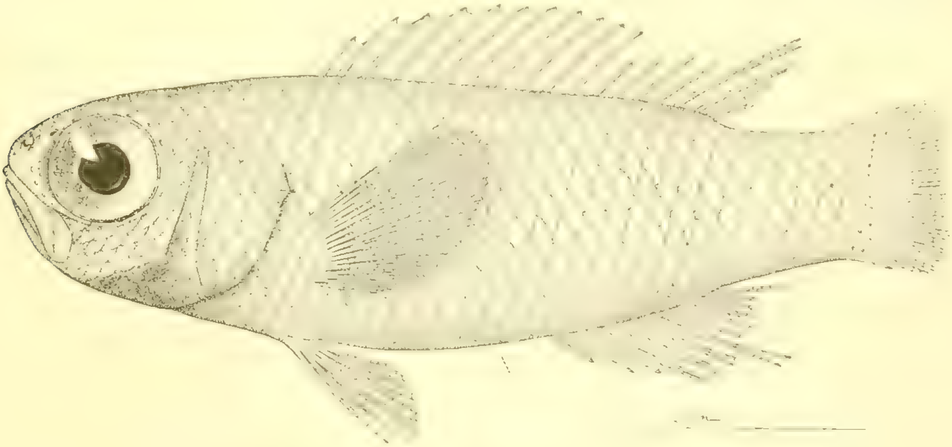


FIG. 240.—*Grammatonotus laysanus* Gilbert, new species. Type.

Dorsal spines slender and flexible, increasing in length to behind middle of fin; last 5 spines about equal; anterior rays of soft dorsal injured in type; fourth ray produced, overlapping rudimentary caudal rays; succeeding dorsal rays again rapidly shortened; anal spines regularly graduated, third spine about five-sixths the longest dorsal spine; anal fin, like soft dorsal, with middle rays produced into a a sharp lobe; sixth and seventh rays overlapping base of caudal, the succeeding ray rapidly shortened; caudal injured in the type, its shape unknown; outer ventral ray produced well beyond spine, overlapping the vent.

Scales large, the free margins finely ctenoid, rough to the touch; head wholly scaled as far forward as front of orbits; the short snout naked; exposed portion of maxillary scaled, but no scales can be detected on mandibles, or branchiostegal membranes; lateral line[a] ascending rapidly to the back, and running along base of dorsal fin, separated from it by a series of narrow half-scales which more or less coincide with and overlap the scales of the lateral line.

Color in life; light purplish red on upper parts, silvery below, a few minute scattered blue spots on posterior half of caudal peduncle; pectorals translucent; other fins light purplish red; anal margined with yellow; the projecting tips of membranes of dorsal spines yellow.

Only the type known.

Family LABRIDÆ.

Cirrhilabrus jordani Snyder.

Station 3876, channel between Maui and Lanai, 28 to 43 fathoms.

Pseudocheilinus evanidus Jordan & Evermann.

Stations No. 3873, channel between Maui and Lanai, 32 to 37 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4073, off the north coast of Maui, 69 to 78 fathoms.

Family POMACENTRIDÆ.

Chromis leucurus, new species. Plate 77, fig. 2.

Type, 66 mm. long, measured to tip of middle caudal rays, from station 3875, Avau Channel, between Maui and Lanai, depth 34 to 65 fathoms; type, 51587, U. S. Nat. Mus.

Length of head 32 hundredths of total length to base of caudal (50 m.); greatest depth 51; least depth of caudal peduncle 16; diameter of orbit 12; interorbital width 11; length of maxillary 9; length of snout 9; distance from tip of snout to front of dorsal 40; highest dorsal spine 19; longest dorsal ray 25; second anal spine 23; filamentous caudal rays 60; length of pectoral 35; length of ventral 34. D. XII, 14, the last ray cleft to base; A. II, 15; P. 16. Tubes in lateral line 13; cross-series of scales 20 or 21.

Body short and deep, resembling *Pomacentrus*, with a short high caudal peduncle, which does not conspicuously taper toward tail; head short and small, a little less than one-third length, eye large, a little more than one-third head; mouth small; maxillary barely reaching vertical from front of eye; in the front of each jaw a wide band of villiform teeth, preceded by a single series of strong conical acute teeth, a little flattened at base, but uniformly tapering to the acute apex; the anterior series is continued on sides of jaw, the teeth of this series much reduced in size; free margins of preorbital and preopercle entire.

Dorsal spines evenly graduated, none of them as long or strong as second anal spine; both anal and soft dorsal have acute lobes, with filamentous tips which extend well beyond base of caudal; caudal deeply forked, both lobes filamentous, produced in long thread-like streamers; outer ventral ray filamentous, reaching same vertical as pectoral, which terminates above first soft ray of anal.

Scales large, ctenoid, caducous, rather irregularly imbricated; lateral line terminating under last dorsal spine.

Color in life, deep brownish black, more intense posteriorly and on soft dorsal and anal fins; posterior half of caudal peduncle and caudal fin white, as are also tips of posterior dorsal and anal rays; a blackish spot on base of pectorals, a lemon-yellow band behind it across basal portion of fin; ventrals lemon-yellow, outer ray and spine dusky; in a young cotype, the sides are much lighter, becoming dusky on caudal peduncle; soft dorsal and anal black.

Specimens taken at stations 3875, channel between Maui and Lanai, 34 to 65 fathoms, and 3982, vicinity of Kauai, 40 to 233 fathoms.

Dascyllus albisella Gill.

Station 3968, French Frigate Shoal, 14½ to 16½ fathoms.

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[a] The lateral line has been omitted by error in the accompanying drawing.

Family ANTIGONIIDÆ.

Antigonia steindachneri Jordan & Evermann.

One specimen 63 mm. long to base of caudal, was dredged at station 3958, vicinity of Laysan Island, depth 173 to 182 fathoms.

For comparison with *A. eos* of equal size, we add the following data:

Length of head 37 hundredths of total length without caudal; diameter of orbit 15.5; interorbital width 12; length of snout 10; maxillary 9; distance from orbit to angle of preopercle 22; greatest depth 126; least depth of caudal peduncle 16.5; length of third dorsal spine 35; first anal spine 14.5; ventral spine 27.5; length of pectoral 37. D. VIII, 38; A. III, 35; P. 14. Between the nape and the anterior portion of lateral line are 14 series of scales running parallel with predorsal profile.

Compared with adults, the young are proportionally deeper, and have the spination of bones of head much less developed, the spines projecting but little beyond the margins of the bones; the scales are very rough, and the exposed portions are much higher than long, as in adults; but the spines are almost wholly confined to the margins of the scales, those arising from the central field, which give such a densely hispid appearance to the adult, being undeveloped, or present in small number; on sides of nape, immediately behind head, is a conspicuous band of larger scales, which scarcely overlap, and are embedded and concealed except for the projecting spinous margin; behind this band, the scales are reduced in size and densely crowded; scales on cheeks are also embedded and concealed, each being represented externally by a straight, vertical, spinous ridge; except for a wedge-shaped area in middle of frontal region, bounded laterally by ridges, the top of head, including sides of occiput and the preorbital, is scaleless.

Antigonia eos, new species. Plate 80, fig. 1.

Type, 83 mm. in total length (67 mm. to base of caudal), from station 4102, Pailolo Channel, depth 122 to 132 fathoms; type, No. 51593, U. S. Nat. Mus.

Length of head 37 hundredths of total length to base of caudal; diameter of orbit 16; interorbital width (at middle of frontal region) 12.5; length of snout 12.5; length of maxillary 9; distance from orbit to angle of preopercle 16; greatest depth 98; least depth of caudal peduncle 14; length of third dorsal spine (the tip injured) 45; first anal spine 14.5; ventral spine 27; length of pectoral 32. D. IX, 33; A. III, 31; P. 13; V. I, 5.

Somewhat deeper and more angular than *A. rubescens* Schlegel, from Japan, and much less so than *A. steindachneri* of equal size. The young are much deeper than adults, more sharply angular, and with high filamentous spinous dorsal fin. In a specimen 25 mm. long to base of caudal the depth is 128 hundredths of this length, the height of the third dorsal spine 100. *A. rubescens* changes comparatively little with age. In *A. eos* the base of soft portion of anal fin is nearly straight, much less curved than in *A. rubescens* and *A. steindachneri*, not more arched than base of dorsal.

Serrated edges in frontal region only moderately developed, the spaces between ridges completely scaled, thus partially concealing them; margin of preorbital with a few short strong spines; vertical limb of preopercle marked with curved serrated ridges, but the margin only minutely serrate; lower margin furnished with a few short, strong teeth; a strong spine marks the articulation of mandible, this spine absent or very inconspicuous in *A. rubescens*.

Head more extensively scaled than in *A. steindachneri*, the scales covering entire frontal region, preorbital, and snout, except the oblong area for reception of premaxillary spines; occiput largely naked; both limbs of preopercle densely scaled; scales on cheeks imbricated, numerous spinules springing from the central field as well as from the margin; scales on body with exposed surfaces much longer in proportion to their height than in *A. steindachneri;* those on posterior part of body with spines much longer and denser than those on anterior parts, the anterior scales having the marginal spinules much shorter and less conspicuous than those which arise from the central field; scales completely investing anterior aspects of the ventral, the first anal, and the third dorsal spines, these spines much less grooved than in *A. steindachneri*.

Even in adults the spinous dorsal is much more elevated than in related species, both third and fourth spines greatly elongate, slender, and delicate; the tips are broken in all of our specimens; the caudal fin is gently rounded.

Color in life light red, abdomen and opercles silvery.

A. eos is nearer *A. rubescens* than *A. steindachneri*, agreeing with *rubescens* in weaker spination and more complete scaling of head, in shape of scales, and in the presence of 9 instead of 8 dorsal spines. The two differ strikingly in outline and in the much shorter dorsal and anal fins of *rubescens*. In 11 specimens of *eos*, not including the type, the fin rays are as follows: Dorsal, 32, 32, 32, 32, 33, 33, 33, 33, 33, 34, 34; anal, 30, 31, 31, 31, 30, 30, 30, 31, 31, 31, 31.

In 5 specimens of *A. rubescens*, from Suruga Bay, Japan (Albatross station 3734), the fin rays are as follows: Dorsal, 27, 27, 27, 27, 27; anal, 25, 25, 26, 27, 27. In both species the dorsal spines are constantly 9 in number.

Specimens were taken at the following stations: No. 3858, Pailolo Channel, 128 to 138 fathoms; 4070, north coast of Maui, 45 to 52 fathoms; 4072, north coast of Maui, 56 to 59 fathoms; 4077, north coast of Maui, 99 to 106 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4104, Pailolo Channel, 123 to 141 fathoms.

Family ZEIDÆ.

Stethopristes, new genus.

Related to *Cyttopsis* and still more closely to *Zen* Jordan and Fowler. From the latter it differs in having the ventral spine greatly reduced and in having a continuous series of carinated spinous bucklers from throat to anus. From *Cyttopsis* it differs also in having 9 instead of 7 ventral rays. In *Cyttopsis* there are but 3 or 4 spinous plates, confined to the mid-ventral line behind ventral fins, the thorax being transversely flattened and without plates. In *Zen* there are in addition 2 flattened plates on the thorax, which is broad and transversely flattened, without trace of keel. In *Stethopristes* the breast is sharply keeled throughout, the ventrals appearing lateral in position.

Stethopristes Gilbert, new genus of *Zeidæ* (*eos*).

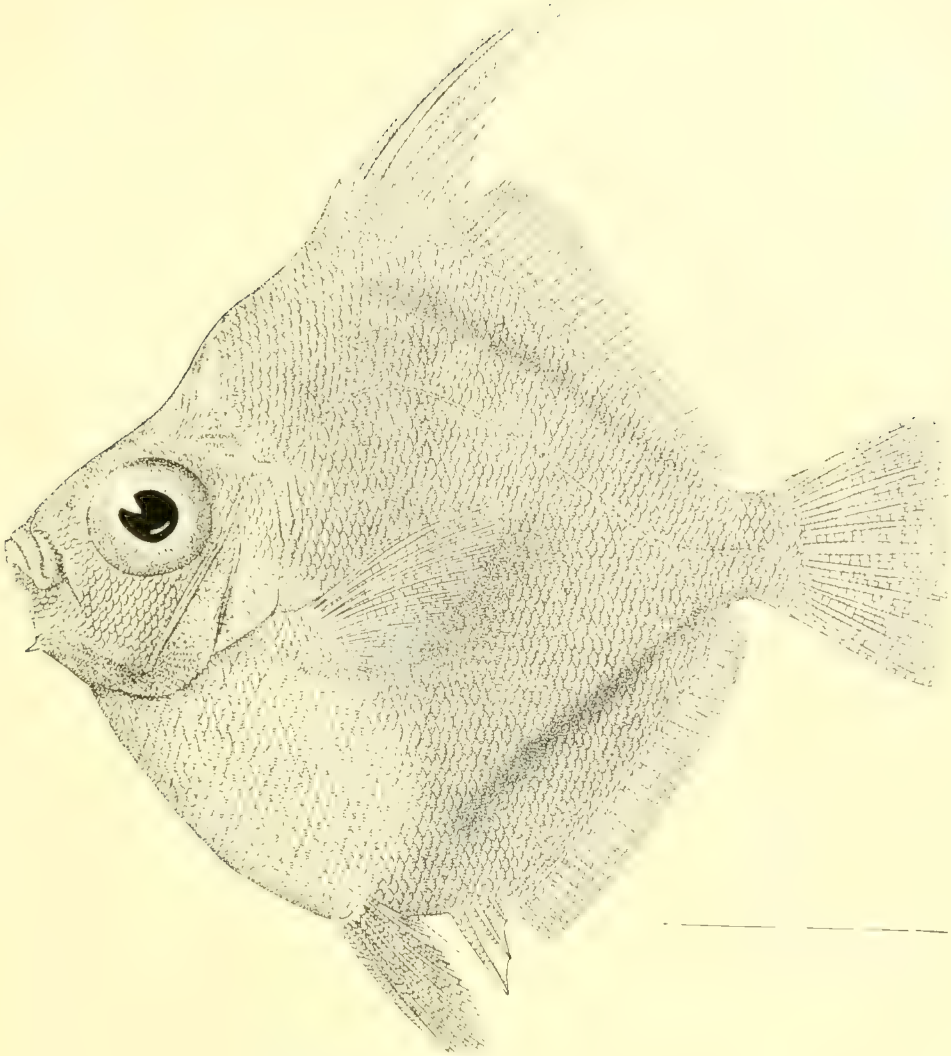
Stethopristes eos, new species. Fig. 241.

Type, 130 mm. long, from Albatross station 3867, Pailolo Channel, between Molokai and Maui, depth 284 to 290 fathoms; type, No. 51626, U. S. Nat. Mus.

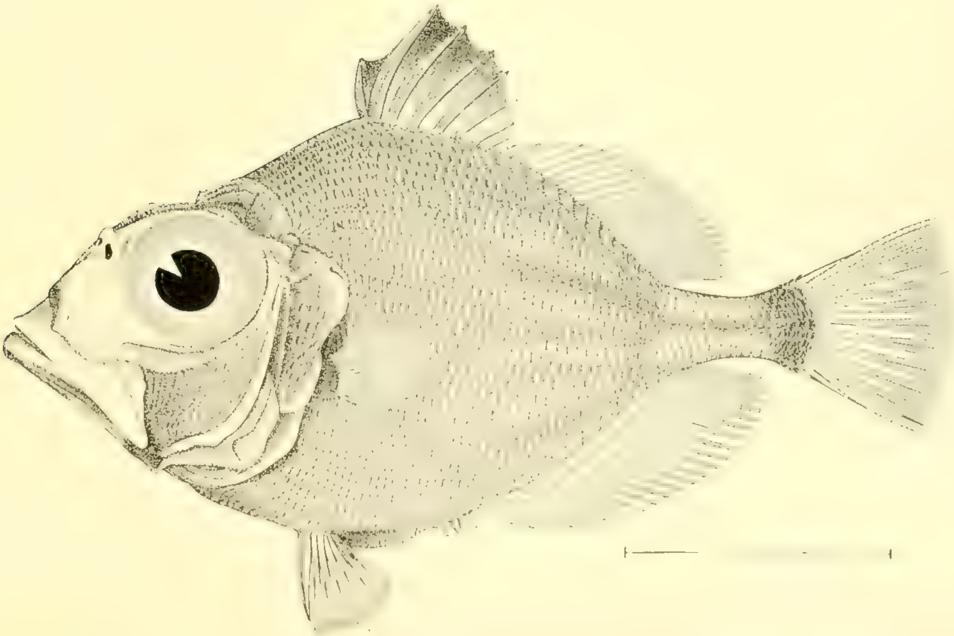
Head 40 hundredths of total length without caudal; eye 17.5; least frontal width 10.5; length of snout 16.5; length of maxillary 21; greatest depth of body 53; least depth of caudal peduncle 8; length of second dorsal spine 11; longest ventral ray 43, longest pectoral ray 14. D. VII, 27, the last ray cleft to the base; A. I, 29; V. I, 9; P. 14. Pores in lateral line 82 or 88; 15 oblique rows of scales between lateral line and middle of base of soft dorsal; branchiostegals 7.

Body deeply oval, with back and belly nearly equally curved, depth greatest under middle of spinous dorsal; maxillary reaching vertical from front of pupil, its length measured from tip of snout half length of head; teeth minute, in narrow bands in jaws and on vomer, these not more than half the width of the bands in the Japanese *Zen itea* Jordan and Fowler; preorbital of moderate width only, half as wide as diameter of eye, concealing only a very little of proximal end of maxillary; eye very large, slightly greater than length of snout; interorbital space and occiput flat, the median portion occupied by a deep elongate-oval pit which lodges the long premaxillary processes; each side of occiput occupied by a plate with minutely roughened surface, sending forward a triangular process which terminates in a spinous point above front of eye; the free margin of this process forms the upper orbital rim, and is furnished with minute teeth which increase in size anteriorly; mandibles terminating posteriorly in a blunt spinous point and anteriorly in a sharp spinous projection at each side of symphysis; other bones of the head smooth, without spines or serrations; branchiostegal membranes moderately joined across throat, forming a free fold; gills 3½, the laminæ short; no slit behind last gill; gill-rakers little developed, short and barely movable, 9 on anterior arch; pseudobranchiæ well developed.

Anterior dorsal with strong short spines, the fin rounded in profile; second, third, and fourth spines about equal in length, two-thirds diameter of eye, the last spine joined by very low membrane to first soft ray; soft dorsal low, the rays increasing in length backward; dorsal rays, like those of pectoral and anal fins, all simple, unbranched, flattened in their distal half; anal similar to soft dorsal, but beginning and ending a little more posteriorly; it is preceded by a simple short strong curved spine, connected by membrane with the first ray; ventrals very large, their tips reaching to or beyond



1. ANTIGONIA EOS GILBERT, NEW SPECIES. TYPE.



2. CYTTOMIMUS STELGIS GILBERT, NEW SPECIES. TYPE.

middle of anal fin, rays all branched nearly to base, 9 in number, preceded by a minute spine; pectorals short, rounded, not reaching vertical from vent; caudal rays deeply forked, the outer ray above and below unbranched, preceded by 4 short spines at base of upper lobe, 3 at base of lower; caudal fin rounded, its length one-fifth total length without caudal.

Scales very small, cycloid, smooth, covering entire body and cheeks; head otherwise naked; rows above lateral line oblique, not parallel with back; no enlarged scales along base of dorsal and anal fins, where are only a series of small nodular projections corresponding in number to the rays; median line of breast and belly in front of anus furnished with a series of large strongly keeled plates, the keel bearing 2 or 3 compressed, backwardly directed spines, the posterior spine, the larger projecting freely; plates 10 in number, decreasing in size anteriorly, the 3 anterior ones small, but sharply keeled and spinous. In one of the cotypes there are 29 rays each in the dorsal and anal, and 11 plates in the ventral series.

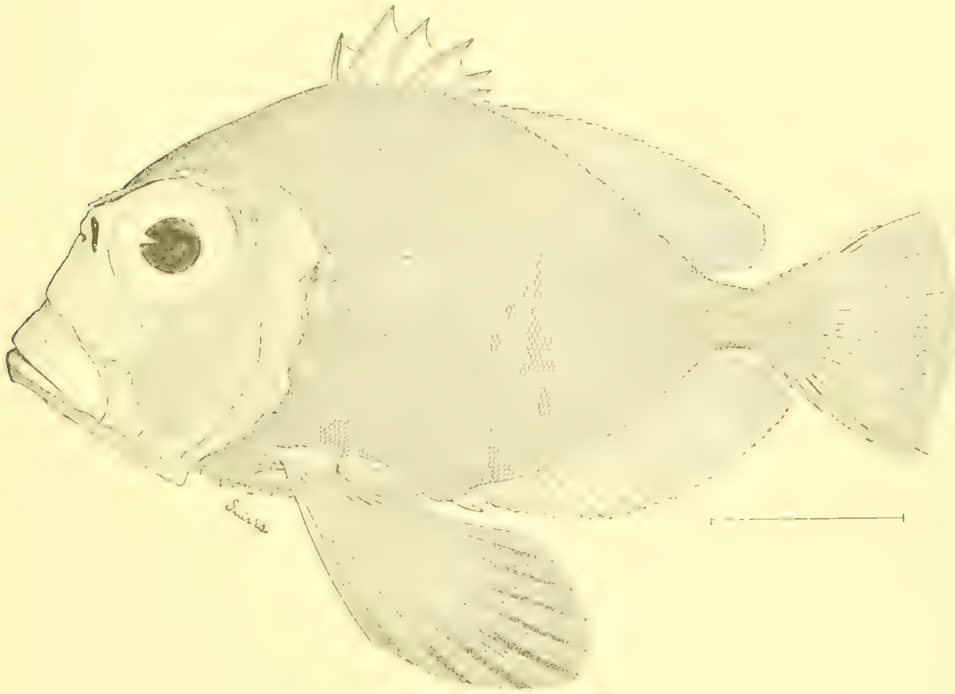


FIG. 241.—*Stethopristes eos* Gilbert, new species. Type.

Color in life silvery, overlaid with light rose color.

Specimens were taken at stations No. 3867, Pailolo Channel, 284 to 290 fathoms, and 4134, vicinity of Kauai, 225 to 334 fathoms.

Family CAPROIDÆ.

Cyttomimus, new genus.

Allied to *Capromimus* Gill, from which it differs in having rough-ctenoid, instead of cycloid, scales in having the thoracic region wide and flat, without ridge or spinous scutes, and in the presence of teeth on vomer and palatine bones.

Cyttomimus Gilbert, new genus of *Caproidæ* (*stelgis*).

Cyttomimus stelgis, new species. Plate 80, Fig. 2.

Type, a female, 91 mm. long, from Albatross station 4122, near Barbers Point, south shore of Oahu, depth 192 to 352 fathoms; type, No. 51622, U. S. Nat. Mus.

Length of head 42 hundredths of total length without caudal; diameter of eye 19; interorbital width 15; length of snout 15; length of maxillary 24; greatest depth 53; least depth of caudal peduncle 7; length of second (longest) dorsal spine 17.5; length of pectoral 13. D. VIII, 23; A. II, 24. P. 14 (in both fins). V. I, 6. Pores in lateral line 53 to 56; branchiostegals 7.

Body rhombiform, compressed, deepest below first dorsal spine, the occiput and interorbital space depressed and flattened; thoracic region wide and flat, without scutes or enlarged scales; base of dorsal and anal fins convex in profile, their outlines rapidly converging to the very slender caudal peduncle, the ventral curve greater than the dorsal; greatest depth of body slightly greater than ½ length to base of caudal; least depth of caudal peduncle ⅖ diameter of eye; head very large, eye large, mouth oblique, with wide cleft, very protractile; interorbital region deeply excavated to receive the long premaxillary processes, which terminate above middle of pupil; distance from tip of snout to end of maxillary equal to length of snout and half eye; maxillary bone deeply grooved longitudinally, its distal end very obliquely truncate and emarginate; a wide fold of integument, reflected backward from upper lip, extends well under the projecting preorbital, conceals the exposed portion of premaxillary spines, and covers all but the posterior ridge of maxillary bone; teeth minute, broadly conical or triangular, present in very narrow bands (having the width of about 3 teeth) in jaws and on vomer and palatine bones; premaxillary band ceasing at a point two-thirds the distance from tip of snout to end of maxillary; preorbital wide, covering a portion of the premaxillary, the margin undulated, the surface marked with fine diverging ridges, which end at the anterior margin in minute spinelets; the bone is excavated to receive 3 wide diverging canals; other bones of suborbital ring are also furnished at margin with a series of minute spines; mandible deeply grooved, the marginal ridges roughened for a portion of their length, each terminating in a strong short spine at posterior end of bone; preopercle deeply grooved, its lower limb and angle minutely serrulate on both the ridges bounding the groove; interopercle similarly with 2 spinous ridges; opercle with a vertical spinous ridge parallel with its anterior margin, but otherwise without striæ or spines; interorbital space broad and flat, its width equal to length of snout, one-third length of head, its median portion soft and membranous; supraorbital rim a heavy, bony process, longitudinally grooved, the bounding ridges of groove rough-granular; the outer ridge is continuous with the posterior orbital margin, the inner ridge extending backward to base of occiput, where it forks to form 4 short, widely diverging branches, covering occipital region; all these ridges rough-granular; branchiostegal membranes widely united to form a free fold across the isthmus, with which they are not united; branchiostegal rays 7 in number; gill-laminæ narrow, inner gill-arch with a single series of filaments; gill-rakers short broad plates with roughened margins, 8 in number on horizontal limb of anterior arch; pseudobranchiæ large.

Pectorals very small, inserted just below a horizontal line from lower edge of pupil, their longest rays equaling length of ventral spine; soft rays of ventral fins slightly longer than pectoral, and barely reaching first anal spine. Insertion of ventrals vertically below pectorals; pectoral rays like those of dorsal and anal fins, expanded and flattened at tip, obliquely articulated, all simple, unbranched; rays of ventral and caudal fins profusely forked; first dorsal composed of 8 spines, of which the second is much the longest and much the strongest, over twice the height of the first spine; from the second, the spines decrease regularly in length and thickness, giving a steeply rounded profile to the fin, the eighth not spine-like in appearance, resembling the rays of the second dorsal, but stiffer and not articulated; all the dorsal spines longitudinally grooved or fluted; rays of second dorsal increasing in length from the first backward to beginning of posterior third, the last rays shortened, but longer than the anterior rays; anal fin similar to soft dorsal, but beginning and ending more posteriorly; anal spines 2 in number, short, strong, curved, the first longer than the second, the 2 spines joined by membrane, the second spine connected by low membrane to the first soft ray; caudal with the posterior margin gently convex.

Body completely scaled, except a narrow strip along bases of dorsal and anal fins; cheeks scaled, head otherwise naked; scales everywhere higher than long, the exposed portions vertically linear, of cycloid type, having entire edges and concentric striæ, but the exposed surface rendered very rough by numberless minute prickles, mostly arranged in vertical cross-series on each scale; the roughest scales are on caudal peduncle, the series of prickles decreasing in number toward head, the scales on nape and cheeks being largely smooth; scales greatly reduced in size on nape and on breast and belly, in 4 oblique rows on cheeks; breast flat, without ridge, no enlarged or carinated plates on breast or belly; dorsal and anal fins in narrow scaleless grooves, bounded by series of enlarged scales, each of which is crossed by an oblique spinous ridge; 11 or 12 such scales along base of soft dorsal and anal fins; they decrease in size anteriorly along the base of spinous dorsal, finally merging into the smaller scales of back and nape; lateral line less arched than the back, but reaching axis of body first on caudal peduncle; six lengthwise series of scales between lateral line and base of soft dorsal.

Color grayish silvery, overlaid with more or less steel-gray, and with some plumbeous streaks and markings; a plumbeous bar below eye, involving posterior end of mandibles; a narrow plumbeous streak along middle of caudal pendunele, expanding posteriorly to cover whole base of tail; above and below this streak the caudal peduncle is flesh-colored, as is also the snout, interorbital region, jaws, and branchiostegals; spinous dorsal blackish, light at base; other fins whitish, unmarked; narrow blackish streaks on supraorbital ridge, diverging from middle of snout to margin of preorbital, on lips and along mandibles.

Capromimus abbreviatus (Hector) is described and figured by Günther (Deep-sea Fishes, Challenger, 1887, 42, Pl. X, fig. B) as having smooth scales and naked palate. *Antigonia mulleri* Klunzinger (Sitzungsb. Akad. Wissen. Wien, LXXX, 1880, 380, Pl. V, fig. 3) is placed by Günther in the synonymy of *abbreviatus*, but the author gives no indication of the nature of the scales or of the dentition. In the original description of *C. abbreviatus* (Hector, Trans. N. Z. Inst., vii, 1875, 239–250) the scales are said to be "very narrow and rough."

Only the type is known.

Family CHÆTODONTIDÆ.

Chætodon corallicola Snyder.

Stations No. 4031, Penguin Bank, south coast of Oahu, 27 to 28 fathoms; 4032, Penguin Bank, south coast of Oahu, 27 to 29 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms.

Holacanthus fisheri Snyder.

Stations No. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3872, channel between Maui and Lanai, 32 to 43 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4031, Penguin Bank, south coast of Oahu, 27 to 28 fathoms; 4032, Penguin Bank, south coast of Oahu, 27 to 29 fathoms; 4033, Penguin Bank, south coast of Oahu, 28 to 29 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms.

Family BALISTIDÆ.

Balistes bursa Lacépède.

Station 4032, Penguin Bank, south coast Oahu Island, 27 to 29 fathoms.

Family MONACANTHIDÆ.

Stephanolepis spilosomus (Lay & Bennett).

Stations Nos. 4147, near Bird Island, 23 to 26 fathoms; 4148, near Bird Island, 26 to 33 fathoms; 4167, near Bird Island, 18 to 20 fathoms.

Stephanolepis pricei Snyder.

Station 4021, near Kauai, 286 to 399 fathoms.

Probably entered the trawl much nearer the surface than above indicated.

Cantherines sandvichensis (Quoy & Gaimard).

One young specimen taken with tangles at station 4163, vicinity of Bird Island, depth 24 to 40 fathoms.

Sides somewhat blotched with light and dark, the dark markings assuming form of faint bars on head, and at base of dorsal and anal fins; dorsal containing 36 rays, anal 32.

Family CANTHIGASTERIDÆ.

Canthigaster cinctus (Richardson).

Three specimens of this conspicuously colored species were dredged in shallow water about the islands.

Head 40 hundredths of total length without caudal; depth of caudal peduncle immediately behind anal fin 24; length of snout 26; interorbital width 10; diameter of orbit 12; length of gill-slit 7, not descending to level of lower pectoral rays; longest pectoral ray 15; height of dorsal 17; length of caudal 31. D. 10; A. 9; P. 17.

Back compressed; interorbital space gently concave; upper profile of snout longitudinally gently concave; entire body and head, except extreme tip and lower side of snout, covered with very short slender spines; nostril minute, consisting of a very short open tube, scarcely discernible without the aid of a lens; caudal fin gently convex, with the outer rays slightly produced.

Color in life light olivaceous; back with 4 broad brownish black bars directed downward and forward; one covers the back of caudal peduncle save a narrow space immediately behind dorsal fin, and narrows downward, its pointed lower end below axis of body and beneath front of dorsal; the second bar includes base of dorsal and an area in front of fin, narrowing to a point below middle of sides; the third bar crosses nape and ends at upper limit of base of pectoral fins; the fourth covers posterior half of interorbital space; upper and lower margins of caudal fin brownish black; snout dusky; the top and sides of head and the light intervals between bars covered with light yellow spots (not bluish, as given by Vaillant and Sauvage), which are usually roundish, and smaller than pupil; these sometimes arrange themselves in lines bordering the dark bars, those about eye frequently coalesce to form longitudinal streaks, and those on lower part of cheeks may unite to form a lengthwise, more or less broken line; there may be a line also bordering gill-slit anteriorly.

Specimens were taken at the following stations: Nos. 3850, off the south coast of Molokai, 43 to 66 fathoms; 4071, off the north coast of Maui, 52 to 56 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms.

Tetrodon (Anosmius) coronatus Vaillant & Sauvage, Revue et Mag. de Zool. (3) III, 1875, 286.

Family OSTRACIDÆ.

Aracana spilonota, new species. Fig. 242.

Type, 94 mm. long, from station 3939, vicinity of Laysan Island, depth 59 to 163 fathoms; type, No. 51630, U. S. Nat. Mus.

Head 31 hundredths of total length without caudal; greatest depth 44; greatest width (without spines) 50; width of lateral face 38; width of dorsal face 21; length of free portion of tail 19; length of snout 24; width over middle of eyes 18; diameter of orbit 16; length of gill-opening 5; longest pectoral ray 19; longest dorsal ray 15; longest caudal ray 23. D. 10; A. 9; P. 12; C. 11.

Body with 6 ridges, including a low ridge on each lateral face; no mid-dorsal or mid-ventral crest; a pair of strong spines near middle of dorsal ridges, and a corresponding but smaller pair near middle of ventral ridges, both compressed and slightly hooked backward; no other spines on body, but a series of low prominences along ventral ridges, which may develop into spines in other specimens; the body plates exhibit 5 to 7 low ridges radiating from center, each ridge with a series of small granules; abdominal plates with more prominent granules, but much less rough than in *A. aculeata* (Houttuyn); free portion of tail wholly invested with small movable plates, which cover lateral portions as fully as upper or lower sides; dorsal face gently convex, interorbital space strongly concave, upper profile of snout perfectly straight; breast not gibbous; eyes large, their diameter greater than distance separating anterior margins of orbits; gill-opening very short, not descending to level of lower pectoral rays; caudal fin gently convex.

Color grayish olive above, lighter below; back and upper portion of sides of head, body and tail with small round brownish green spots, about one-third size of pupil; lower parts white, fins unmarked.

A specimen 36 mm. long, from station 3965, vicinity of Laysan Island, depth 116 to 147 fathoms, differs markedly in general proportions from the type. It is much broader, with wider flatter interorbital space, and the posterior half of the dorsal face deeply concave transversely, instead of convex. The breast is gibbous. In other respects, it agrees with the type and doubtless represents the last in the series of larval changes, which are very extensive in these forms.

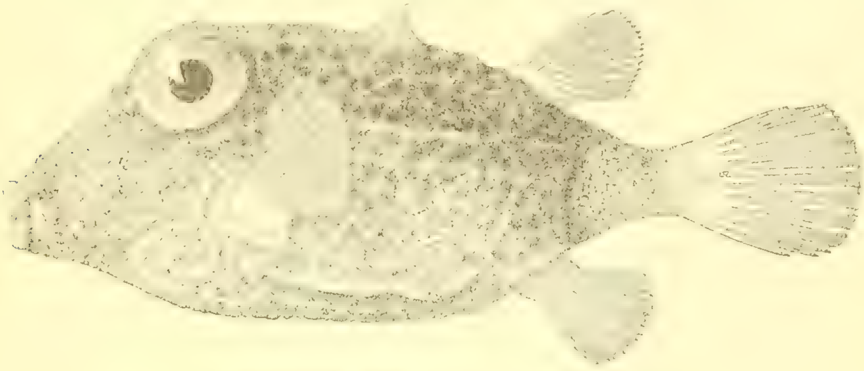


FIG. 242.—*Aracana spilonota* Gilbert, new species. Type.

But 2 specimens secured.

Family SCORPÆNIDÆ.

Sebastapistes coloratus, new species. Fig. 243

Type, 77 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51631, U. S. Nat. Mus.

Head 47 hundredths of total length to base of caudal; diameter of orbit 16; width at middle of interorbital space 6; length of snout 11; length of maxillary 20; depth of body 38; least depth of caudal peduncle 9; longest (fourth) dorsal spine 20; eleventh dorsal spine 8; twelfth dorsal spine 15; longest dorsal ray 20; first anal spine 9; second anal spine 19; third anal spine 16; longest pectoral ray 31; longest ventral ray 24. D. XII, 9, last ray divided to base, appearing like 2 distinct rays; A. III, 5; P. 17. Tubes in lateral line 25 or 26.

Eye much longer than snout, 3 times the least width of interorbital space, which is moderately concave; from middle of interorbital space a pair of well-marked longitudinal ridges diverging anteriorly to base of nasal spines and posteriorly to occipital fossa, bridging the latter to join base of parietal ridge; occipital fossa deep, quadrate; preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, the parietal and nuchal not in a straight line with the others; postocular broad and triangular, tympanic slender, erect, thorn-like, parietal and nuchal comparatively low and inconspicuous; a group of 3 or 4 very small spines on posterior orbital rim, followed posteriorly by a ridge terminating in a small spine, these in a direct line with lower suprascapular ridge and spine; a second smaller suprascapular spine, parallel with first, above point of origin of lateral line; upper preopercular spine much the largest, in a direct line with subocular ridge, and bearing a minute spinous point at its base; subocular ridge low but sharp, and bearing 3 minute spines; four short strong spines below upper preopercular spine, the second not smaller than the third; preorbital with two strong spines diverging from a common base; nasal, preocular, supraocular, parietal, preorbital, and lower preopercular spines accompanied by cutaneous flaps, which are of moderate width and mostly without fringes; flaps also present on cheeks and opercles, along lateral line, and scattered on scales of trunk; supraorbital flap long and broad, often incised, usually extending to base of nuchal spine; maxillary not extending to below middle of the large eye; teeth very finely villiform, in a broad band in premaxillaries, a narrow band in mandibles, and still narrower bands on vomer and palatines; length of palatine band nearly equaling diameter of pupil; neither slit nor pore behind fourth gill-arch, the laminæ of which are much reduced; gill-rakers short, slender, toothed, 7 freely movable on horizontal limb of anterior arch.

Spinous dorsal evenly rounded; third and fifth spines equal, fourth a little longer; second anal spine much longer and stronger than third, a little shorter than fourth dorsal; only 3 or 4 of the pectoral rays branched, the upper 2 and the lower 10 or 11 simple; pectoral base not procurrent, the lower rays but little thickened and exserted; upper rays of lower division of fin longer than the others; ventrals reaching front of anal fin; vent separated from anal fin by a distance equaling one-fourth length of ventrals.

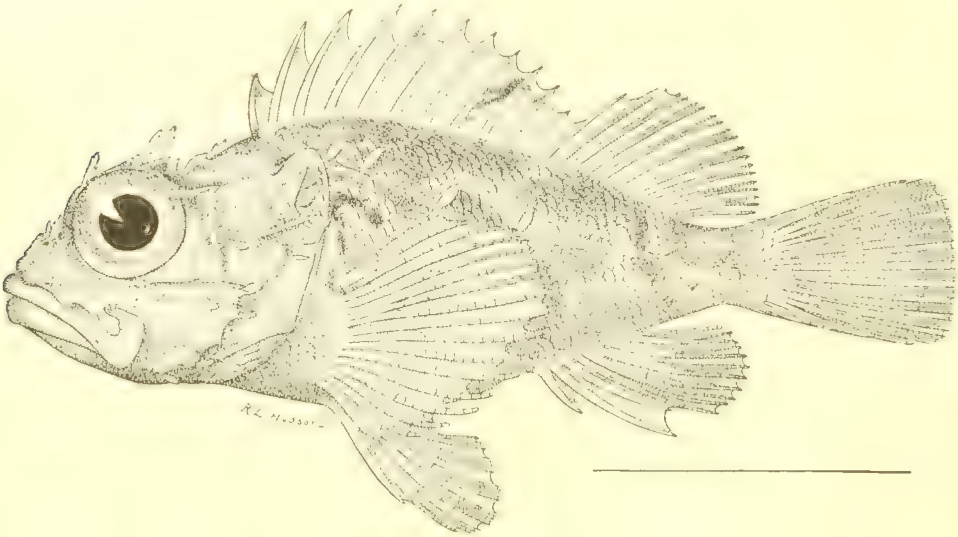


FIG. 243.—*Sebastapistes coloratus* Gilbert, new species. Type.

Scales strongly ctenoid on sides, cycloid on belly, breast, and prepectoral area, these regions all completely invested; a small patch of ctenoid scales behind eye on uppermost portions of cheeks and opercles; remainder of head wholly scaleless.

Color in spirits: Upper half of body largely bright rose-red or purplish, traversed by a few irregular curved lines of the grayish olive ground color, one crossing back under last dorsal spines, one under last soft rays; lower parts all light grayish olive; interorbital space and upper part of eye bright red, lower half of iris yellowish or golden; red blotches on cheeks, opercles, branchial membranes and roof of mouth; sides of head sometimes with bright pearly blotches, a small red spot or blotch near base of pectoral rays; dorsals reddish, with much white pigment, the red more intense near margin of fin, the tips of spines narrowly white; a small blackish spot on terminal portion of eighth to ninth dorsal spines.

Specimens were taken at stations Nos. 3849, off the south coast of Molokai, 43 to 73 fathoms, and 3850, off the south coast of Molokai, 43 to 66 fathoms.

Scorpænopsis altirostris, new species. Fig. 244.

Type, 62 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51636, U. S. Nat. Mus.

Head 52 hundredths of total length to base of caudal; diameter of orbit 15; width at middle of interorbital space 7; length of snout 14; length of maxillary 24; depth of body 40; least depth of caudal peduncle 11; longest (fourth) dorsal spine 23; eleventh dorsal spine 13; twelfth dorsal spine 17; longest dorsal ray 23; first anal spine 12; second anal spine 26; third anal spine 18; longest pectoral ray 37; longest ventral ray 27; length of caudal 34. D. XII, 9, the last ray cleft to base; A. III, 5; P. 17. Tubes of lateral line 24 or 25.

Head large, compressed, with subvertical cheeks, snout short and high, without preocular depression. The species thus more closely resembles the small brightly colored *Sebastapistes* from the South Seas than it does other species of *Scorpænopsis*. Occipital fossa moderate, quadrate; a shallow pit below the eye; eye large, prominent, slightly larger than snout, more than twice width of interorbital space, which is deeply concave, its floor with a pair of inconspicuous ridges which do not cross the occipital fossa; at outer edge of each of these ridges near middle of interorbital space is a pair of conspicuous mucous pores; preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, the tympanic duplicated (as an irregularity) in the type; parietal and nuchal spines not in a line with the others; a group of small prickles immediately behind eye on a level with upper end of gill-slit; behind these a ridge terminating in a spine, succeeded by the similar suprascapular ridge and spine; between the latter and the nuchal spine an oblique crest bearing several small spines; subocular crest low and sharp, with 4 low spines directed backward, each terminating a short secondary crest, the anterior 2 a little below the main ridge; upper preopercular spine short and strong, larger than the others, in line with the subocular ridge and bearing a smaller spine at its base; four short spinous points below upper preopercular spine, regularly graduated from above; margin of preorbital with 2 strong divergent spines, the posterior compressed and much larger than the anterior; preorbital also with a small spine directed upward and backward toward eye; below upper opercular spine a number of subsidiary spines and ridges: one or more small spines and ridges may also develop below lower opercular ridge; broad cutaneous flaps present on anterior nasal tube, and on supraocular, parietal, preorbital, and lower preopercular spines; a few accompany lateral line, and a small number are scattered on trunk, sides of head, maxillary and mandible; supraocular flap very long in the type, the margin variously cleft, nearly reaching front of dorsal when depressed; it is subject to great variation in its development, and is scarcely to be distinguished in some of the cotypes; maxillary wide posteriorly, reaching vertical from posterior edge of orbit; teeth in moderate bands in jaws, in a very narrow band (about 2 series) on vomer; palatines toothless; no trace of pore or slit behind fourth gill-arch; gill-rakers very short barely movable, with enlarged spinous tips, 7 or 8 on horizontal limb of anterior arch.

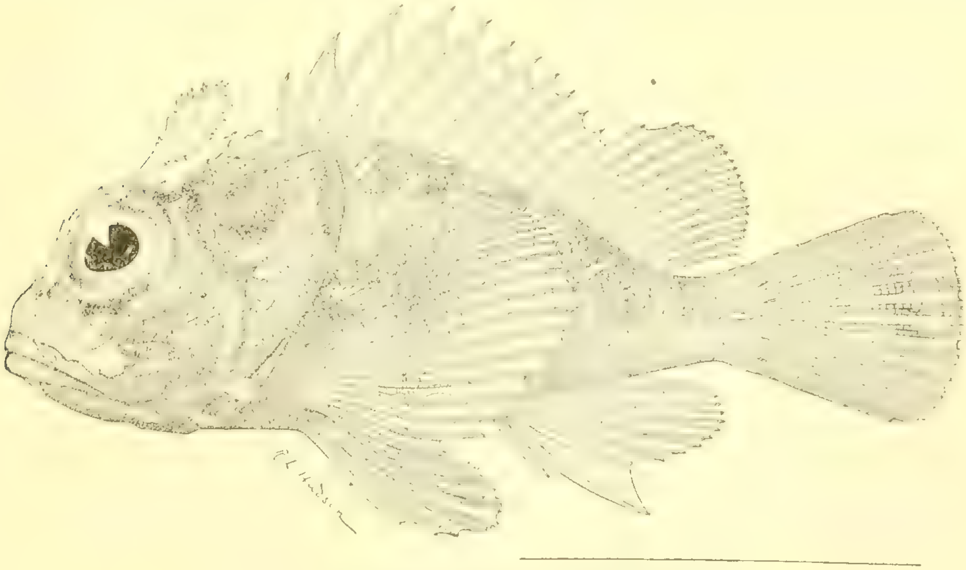


FIG. 241.—*Scorpænopsis altirostris* Gilbert, new species. Type.

Spinous dorsal evenly rounded; fourth spine longest, equaling height of soft rays; fifth higher than third; second anal spine much longer than third, and also longer than longest dorsal spine; ventrals extending beyond origin of anal; upper pectoral ray and the lower 10 rays simple, the others branched; pectoral not procurrent, some of the simple rays of the lower half the longest.

Scales weakly ctenoid and somewhat deciduous on sides of body, cycloid on belly, breast, and prepectoral area; a few ctenoid scales on upper part of cheeks and opercles, the head otherwise scaleless; skin of sides and top of head quite generally covered with minute papillæ, most of which inclose a central prickle, these found even upon scales of head.

Color in life, snout, upper part of head and lower jaw, purplish; preopercle with a greenish spot; occiput brown, tinged with brassy; sides of body mottled with lilac, brick-red, vermilion, greenish, and pearly bluish white; a whitish streak running from belly obliquely upward and backward to dorsal fin; dorsal mottled with red and lilac, parts of it translucent, the tips of the spines usually white; caudal clouded with vermilion, the lower part tipped with lemon; anal clouded with lake-red, tipped with lemon; pectoral lake-red, upper part yellowish olive; ventrals lake-red; throat suffused with lilac; belly white.

Six specimens were secured, all from station 3849.

Peloropsis, new genus.

Allied to *Scorpænopsis*, but with head and belly closely compressed, the proximal half of rostrum much contracted, the scales all cycloid, the head naked, the belly and breast completely scaled, the pectoral fin not procumbent below and the third dorsal spine much produced beyond the others.

Peloropsis Gilbert, new genus of *Scorpænidæ* (*xenops*).

Peloropsis xenops, new species. Fig. 245.

Type, 152 mm. long, from station 3872, Avau Channel, between Maui and Lanai islands, depth 32 to 43 fathoms; type, No. 51604, U. S. Nat. Mus.

Head 47 hundredths of length from tip of snout to base of caudal; greatest depth 46; least depth of caudal peduncle 12; greatest thickness 22; diameter of orbit 9; interorbital width 5.5; length of snout 18; thickness of basal portion of rostrum 3.5; length of maxillary 23; length of longest (third) dorsal spine 35; fourth spine 25; eleventh spine 11; twelfth spine 14; longest soft dorsal ray 18; first anal spine 12; second anal spine 22; third anal spine 21; highest anal ray 27; length of caudal 33; pectoral 34; ventral 29. D. XII, 9, the last ray cleft to base and appearing like 2 rays; A. III, 5, the last ray cleft to base; P. 18. Tubes of lateral line bearing no definite relation to the scales, 23 in number; scales in irregular series, about 70 vertical rows above lateral line.

Body everywhere closely compressed, greatest width (at opercles) scarcely half the depth; region between eyes and nostrils uniformly contracted and compressed to a mere keel, snout in front and the interorbital behind abruptly widened; the interorbital space very deeply channeled, without ridges, its width but little more than half diameter of eye; occipital region much contracted immediately behind orbits, upper half of orbital rim prominently elevated and separated from rest of head; nasal spines small; low preocular, supraocular, and postocular spines present, and a high compressed parietonuchal ridge, consisting of 2 fused spines; occiput with a quadrangular depression a little below level of interorbital groove, separated from this and other adjacent regions by low ridges; a pair of shallow cup-like depressions on sides of interorbital space below that portion of supraorbital rim which lies between supraocular and postocular spines; a small and a large supraocular spine, and one behind middle of orbit; a wide excavated space intervenes between orbit and subocular ridge, which bears a series of 4 low spines directed backward; the ridge joins preopercle nearly midway between first and second preopercular spines, which are short, triangular, equal in length; a shorter third preopercular spine present, and a slight protuberance representing fourth spine; margin of preorbital with 2 small lobes, each provided with an indistinct spinous point; head, body, and fins well furnished with cutaneous flaps; on head they occupy the usual positions, in connection with nasal tube, supraocular and preocular spines, lobes of preorbital, and maxillary and mandible; on sides, the largest flaps are along lateral line, smaller ones being variously scattered; broad flaps are attached to tips of anterior dorsal spines; smaller flaps and filaments scattered over dorsal and pectoral fins; mandible protruding beyond snout, its tip with a short symphyseal knob; maxillary very broad, reaching a vertical slightly behind orbit; teeth very fine, in narrow bands on mandible and vomer, in a broad band in premaxillaries; palatines toothless; no slit or pore behind fourth arch; gill-rakers scarcely movable, spinous, few in number.

Dorsal spines compressed, the third much produced beyond the others, the first spine about equaling the eleventh, the second equaling the seventh; third, fourth, and fifth spines all higher than the soft rays; membrane from last dorsal ray joining almost entire length of caudal peduncle. Second and third anal spines about equal, the third appearing longer, the three spines seemingly graduated; ventrals reaching half-way between vent and front of anal; pectorals to opposite middle of anal base; upper pectoral ray simple, second to seventh rays forked at tip, the remaining rays simple, thickened, a little exserted, the ninth ray longest; pectoral not at all procurrent below, the base of the lowest ray vertically under or a little behind the uppermost ray.

Scales all cycloid, small, somewhat irregularly arranged, completely investing the body; head and fins wholly naked.

Color in life very brilliant. Head, body, and fins bright vermilion, upper parts of head and body darkened with olive tint, and with small scattered purplish spots, which are also found on upper half of pectoral fin; head, lower parts of body, and fins mottled with yellowish white; flaps and tentacles narrowly edged with bright lemon-yellow; a large blackish blotch below eye, one on opercle and one at base of pectoral; a conspicuous broad, yellowish white bar on each side of compressed part of rostrum; three groups of brownish spots along base of dorsal fins; conspicuous white spots on back of tail and at base of eighth and ninth dorsal spines; a larger blotch below the latter just above lateral line.

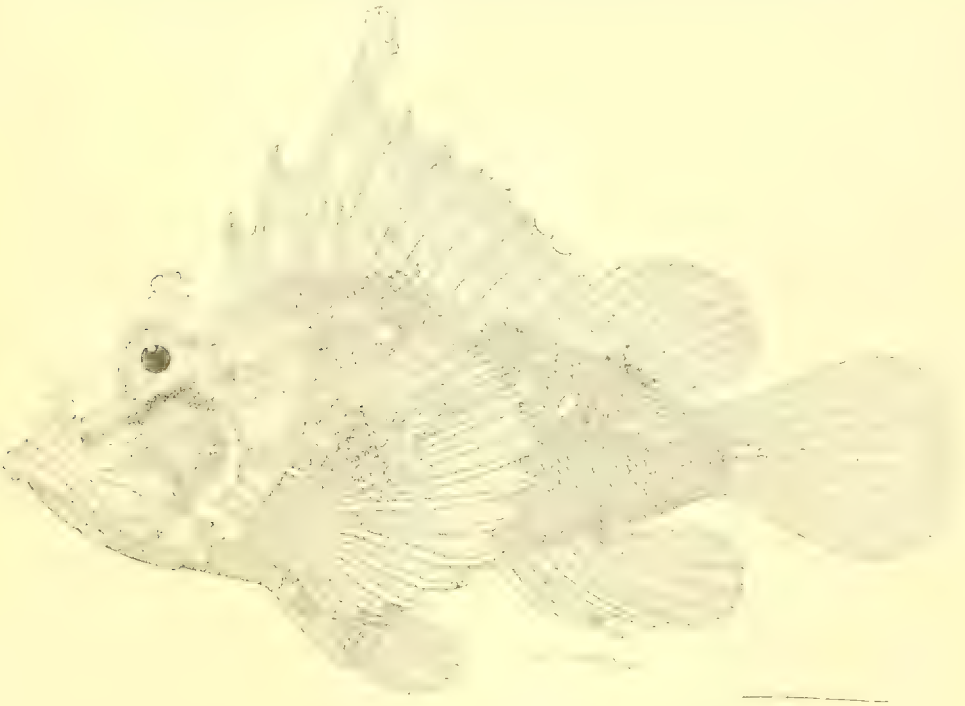


FIG. 245.—*Peloropsis xenops* Gilbert, new species. Type.

Only the type known.

Helicolenus rufescens, new species. Fig. 246.

Type, 105 mm. long, from station 4133, vicinity of Kauai, depth 41 to 165 fathoms; type, No. 51628, U. S. Nat. Mus.

Head 48 hundredths of total length to base of caudal; diameter of orbit 16; width of middle of interorbital space 5; length of snout 14; length of maxillary 24; depth of body 37; least depth caudal peduncle 10; longest (third) dorsal spine 21; eleventh dorsal spine 9; twelfth dorsal spine 13; longest dorsal ray 17; first anal spine 7; second anal spine 22; third anal spine 15; longest pectoral ray 31; longest ventral ray 25. D. XII, 9; last ray divided to base; A. III, 5; P. 18. Pores of lateral line 25 or 26; vertical rows of scales above lateral line about 52.

Eye very large, oval, longer than snout; interorbital space very narrow, less than diameter of pupil, deeply concave; occiput gently concave, without pit or any special depression; occipital and supraorbital spines forming a single series, all the spines lying in a straight line, or the tympanic spine very slightly displaced to the side; spines all low but strong; preocular spine separated by a wide interval from 3 closely approximated over posterior part of eye, these followed by occipital and nuchal spines; occipital ridge short; two strong suprascapular spines, and 2 or 3 spines in front of these immediately behind orbit, one of the latter terminating a well-defined ridge; infraorbital ridge well-defined, bearing 3 low spines, in direct line with the uppermost and strongest preopercular spine, which bears a smaller one at its base; below this 4 small preopercular spines directed backward, the second shorter than the third; margin of preorbital bearing 2 strong spines directed downward and backward; nasal spines small. Short narrow flaps, usually fringed near tips, occur as follows: one on anterior nasal tube, and one each on preocular, supraocular, and parietal spines, the preorbital spines and the lower 2 preopercular spines; a few simple flaps present along lateral line. Cheeks, opercles, and occiput covered with ctenoid scales, a few present also on interorbital space; snout, mouth-parts, and lower side of head scaleless; maxillary reaching a vertical from posterior margin of pupil; teeth in finely villiform bands on jaws, vomer, and palatines; branchiostegals 7, the inner extremely delicate, concealed in membrane; pseudobranchiæ large; gill-rakers very short, spinous, only 7 or 8 movable on horizontal limb of anterior arch; a very narrow slit behind fourth gill-arch.

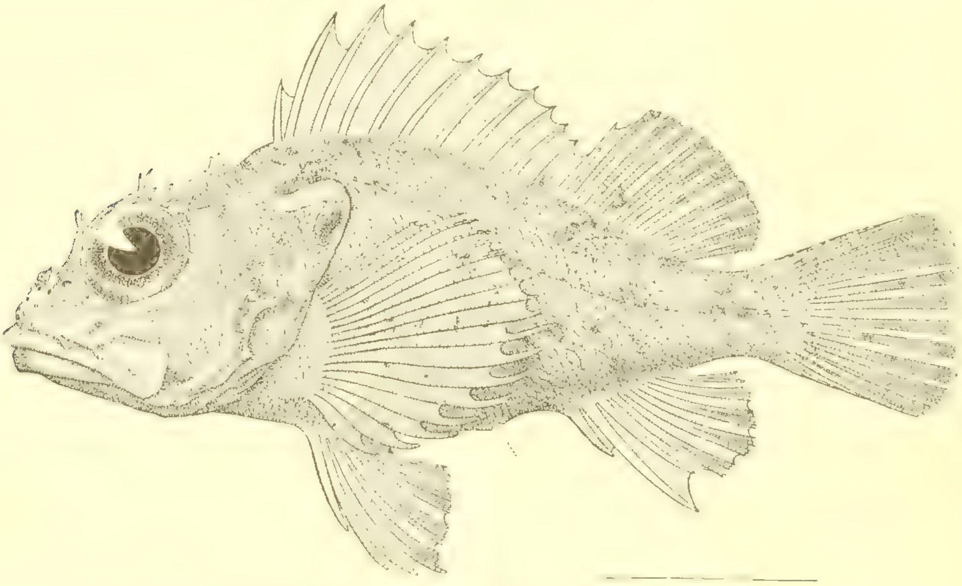


FIG. 216.—*Helicolenus rufescens* Gilbert, new species. Type.

Dorsal spines low and strong, the fin deeply notched between eleventh and twelfth spines; second anal spine longer and stronger than third or any of the dorsal spines; caudal truncate; ventrals reaching vent, which is separated from front of anal by a distance equaling one-third length of ventral fins; lower 12 pectoral rays simple, thickened, free at tip, some of them produced beyond the upper branched rays; uppermost 3 or 4 rays likewise simple.

Scales thin, rather weakly ctenoid, those on belly and breast smooth; tubes of lateral line with a membranous roof.

In life, blotched with bright vermilion and pearly white, the white most conspicuous on fins and in axil of pectorals; some dusky brownish specks and mottlings scattered on body, and on dorsal, caudal, and pectoral fins. Lining membranes of mouth, gill-cavity, and body cavity white.

A second smaller specimen (78 mm. long) was taken at station 4074, off north coast of Maui, depth 78 to 85 fathoms. It differs conspicuously in length of the supraorbital tentacle, which extends beyond the nuchal spines. The pectoral rays are in this young specimen all simple. The species is closely related to *Pontinus spilistius*, described from young specimens only. It may well be that adults of the latter have some of the pectoral rays forked, in which case the species would be referred to the genus *Helicolenus*, which is of doubtful validity.

Only 2 specimens obtained.

Pontinus spilistius, new species. Fig. 247.

Type, 90 mm. long, from station 4077, off the north coast of Maui, depth 99 to 106 fathoms; type, No. 51644, U. S. Nat. Mus.

Head 47 hundredths of total length to base of caudal; diameter of orbit 12; width at middle of interorbital space 4; length of snout 13; length of maxillary 21; depth of body 36; least depth of caudal peduncle 11; longest (third) dorsal spine 16; eleventh dorsal spine 8; twelfth dorsal spine 12; longest dorsal ray 17; first anal spine 6.5; second anal spine 19; third anal spine 15; longest pectoral ray 31; longest ventral ray 24.5. D. XII, 10, last ray divided to base; A. III, 5, last ray divided; P. 17. Pores in lateral line 24 or 25; vertical rows of scales above lateral line 55.

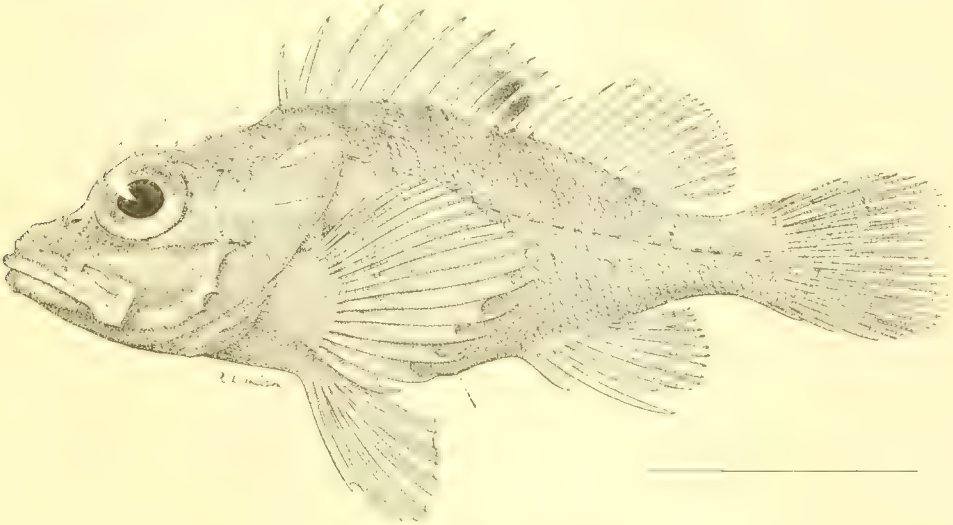


FIG. 247.—*Pontinus spilistius* Gilbert, new species. Type.

Eye shorter than snout, but more than twice width of the narrow, deeply concave interorbital space; occiput rendered concave by parietal ridges, but without pit or depression; nasal spines small; strong but low preocular, supraocular, postocular, tympanic, parietal, and nuchal spines, the postocular and tympanic displaced laterally, not in line with the others; two ridges below tympanic spine, immediately behind eye, the lower longer and stronger than the upper, and bearing a single strong spine on a level with the 2 suprascapular spines; opercular spines slender; a sharp ridge from preorbital along suborbitals to preopercle, joining the latter at base of the upper longest preopercular spine, which bears a smaller spine near its base; subocular ridge with 3 short backwardly directed spines; in the type, but 2 small preocular spines can be detected below uppermost spine, but in young specimens 2 more very minute ones are present, which evidently disappear with age; numbered from above, the latter form the second and fifth spines of the series; on margin of preorbital are 2 minute spinous points anteriorly, and a rather strong spine posteriorly; all the cirri are compressed, narrowly lanceolate, with entire edges; a pair of cirri present on nostril rim and one each at base of the preocular, supraocular, occipital, and the 2 posterior preorbital spines; a series also accompanies lateral line; maxillary falls short of vertical from middle of orbit; teeth finely villiform, in moderate bands on jaws and vomer, in a long narrow band on palatines; branchiostegals 7, the anterior concealed; pseudobranchiæ large; gill-rakers clavate, toothed, short, about one-third diameter of pupil, 9 present on horizontal limb of anterior arch; a narrow slit behind fourth gill-arch; scales on cheeks mostly smooth, those on opercles and occiput strongly ctenoid; interorbital space, snout, mouth parts, and lower side of head largely naked.

Spinous dorsal very low, rounded, the last spine much longer than the preceding spines; first anal spine very short, the second longer and stronger than the third, or than any of the dorsal spines; pectorals reaching vertical from third anal spine; all the rays simple in the type, the lower thickened, with projecting tips, the longest rays just below middle of fin; ventral fins extending a little beyond vent, which is distant from front of anal slightly more than one-third length of ventrals.

Scales moderately ctenoid, those on breast, prepectoral area, and abdomen smooth; tubes forming lateral line membranous.

Color, reddish, with dusky mottlings along back, and lighter or reddish blotches at base of dorsal fin; a broad light reddish bar on tail; snout and top of head finely speckled with olive-brown; a black spot between seventh and tenth dorsal spines, and small dark spots at base of some of the spines and rays; two small dark spots dividing base of pectoral fin into thirds; mouth and gill-cavity white.

The species was taken at stations No. 4077, off the north coast of Maui, 99 to 106 fathoms, and 4098, off the north coast of Maui, 95 to 152 fathoms.

Setarches remiger (Gilbert & Cramer).

As in other species of *Setarches*, the lateral line is a very broad membranous tube overlying the scales. There are 25 or 26 segments of this tube corresponding to the sensory papillæ. In young specimens all the pectoral rays are simple, but in adults all are forked except the upper 2 and the lower 5 or 6 rays. The lower undivided rays are somewhat thickened.

The following details correct those given in the original description: Snout much longer than diameter of orbit; two lower preocular spines smaller than the others, but well developed; width of dilated end of maxillary contained $1\frac{2}{7}$ in diameter of orbit; a narrow band (or a single series) of minute teeth along entire length of palatines; ventral fins extending but $\frac{2}{3}$ distance from their base to vent; caudal fin truncate, with rounded angles; five heavy pyloric cæca; pseudobranchiæ well developed.

The species was taken at the following stations: Nos. 3865, Pailolo Channel, 256 to 283 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3898, Pailolo Channel, 258 to 284 fathoms; 3899, Pailolo Channel, 283 to 284 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 3942, vicinity of Laysan, 146 to 222 fathoms; 3943, vicinity of Laysan, 100 to 222 fathoms; 3947, vicinity of Laysan, 97 to 199 fathoms; 4058, off the northeast coast of Hawaii, 190 to 195 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Scorpæna remigera Gilbert & Cramer, Proc. U. S. Nat. Mus. XIX, 1897, 418, pl. XL.

Plectrogenium, new genus.

Related to *Sebastosemus*, but much more slender, with broad head, the width of which equals the depth, and with dorsal fin divided to base; second anal spine longer and stronger than third; pectoral notched, its upper portion consisting of forked rays, the lower unbranched, some of them elongate, forming a projecting lobe; scales large and strongly ctenoid, covering head and pectoral fins; no occipital pit; interorbital region flattish; a series of very strong spines along sides of head.

Plectrogenium Gilbert, new genus of *Scorpænidæ* (*nanum*).

Plectrogenium nanum, new species. Fig. 248.

Type, 70 mm. long, from station 4082, off north coast of Maui, depth 220 to 238 fathoms; type No. 51598, U. S. Nat. Mus.

Length of head 40 hundredths of total length without caudal; depth of head at occiput 22; greatest width of head (without spines) 26; diameter of eye 15; width of middle of interorbital space 8; length of snout 10; length of maxillary 12; greatest depth of body 25; least depth of caudal peduncle 9; length of caudal peduncle from base of last anal ray 27; longest (fourth) dorsal spine 16; second anal spine 16; third anal spine 12; longest pectoral ray 25; longest ventral ray 22. D. X-II, 7; A. III, 5; P. 23. Scales in lateral line 28 or 29, 23 series above lateral line, 7 series between lateral line and vent.

Body elongate, little compressed, width two-thirds depth; upper profile of head rising in a gentle unbroken curve from snout to dorsal fin; head without pits or depressions; interorbital space wide, flat or very gently concave; a series of very strong, compressed, backwardly hooked spines along lateral profile of head, 1 on preorbital, 2 on suborbital stay, and 1 on preopercular margin; a smaller cusp at anterior base of each larger one, that at base of preopercular spine larger than the others; in front of the preorbital and the anterior suborbital spines several smaller spinelets; beneath the preorbital spine a second series of short backwardly hooked spines overlapping maxillary; opercular margin with 2 spines, the lower terminating a knife-like ridge which bears 2 smaller spines; supraorbital rim not elevated, bearing a row of strong spines directed outward and backward; within these a pair of curved, diverging, finely serrulate ridges; occipital ridges very short, with diverging spines; 2 or 3 paroccipital spines; a strong suprascapular spine; mouth very small, horizontal; mandible included; maxillary narrow, scarcely reaching vertical from front of pupil; finely villiform teeth in jaws, vomer, and palatines, the palatine band very narrow, the outer series in premaxillaries a little enlarged; branchiostegals 7, membranes distinct and free; pseudobranchiæ large; gill-laminæ much reduced, the posterior filaments of fourth arch rudimentary; slit behind fourth arch evident; gill-rakers short, unarmed, less than one-third diameter of pupil, 11 or 12 on horizontal limb of first arch.

Spinous dorsal low, with evenly rounded contour, the fourth spine highest, the tenth very short, its membrane not joined to the eleventh, which is much longer; twelfth spine as long as ninth and but little shorter than soft rays; first anal spine about as long as third, much shorter than second; base of anal equal to that of second dorsal, the 2 fins exactly opposite; upper pectoral rays slender, all but the upper 2 forked, about 8 of the lower rays simple and a little thickened, some of them produced, longer than the rays above and below them, but not so long as the longest pectoral rays, which reach to or a little beyond front of anal; third ventral ray longest, reaching first anal spine; caudal slightly emarginate.

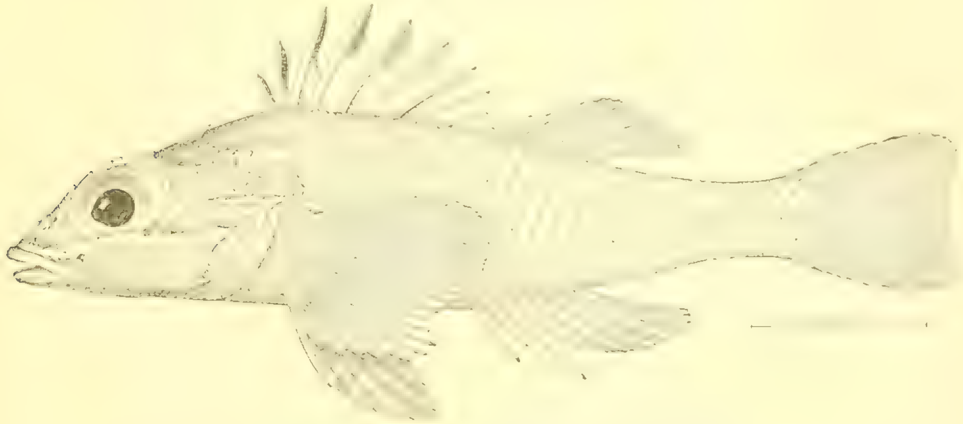


FIG. 248.—*Plectrogenium nanum* Gilbert, new species. Type.

Scales large, strongly ctenoid, those on head and pectoral fin much reduced in size; lateral line of normal type, each scale bearing a tube which opens in a pore near margin of scale; no cutaneous canal overlying the scales, as in *Setarches;* only mandibles, lips, and gill-membranes scaleless.

Color in life almost uniform rose-red; a dusky streak on membrane behind distal half of each dorsal spine, and a dusky blotch on middle of soft dorsal, these colors more intense in the young, where a faint dusky bar may often be detected beneath each dorsal fin, and a narrow streak on middle of caudal peduncle; mouth, branchial and abdominal cavities whitish.

Bones of head firm and not heavily channeled, the species not evidently adapted for life at considerable depths. Fifteen specimens were secured.

Specimens were taken at the following stations: Nos. 3952, vicinity of Laysan, 347 to 351 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4080, off the north coast of Maui, 178 to 202 fathoms; 4081, off the north coast of Maui, 202 to 220 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Tænianotus citrinellus, new species. Plate 81.

Type, 50 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51634, U. S. Nat. Mus.

Head 43 hundredths of total length to base of caudal; depth 54; depth of caudal peduncle 13; greatest thickness (at opercles) 14; length of snout 15; diameter of orbit 10; length of maxillary 20; interorbital width 6; first dorsal spine 23; second dorsal spine 35; longest (third) dorsal spine 37; last dorsal spine 25; first dorsal ray 30; longest dorsal ray 33; last dorsal ray 19; first anal spine 12; second anal spine 20; third anal spine 23; longest anal ray 28; longest caudal ray 35; longest pectoral ray 44; longest ventral ray 28. D. XII, 10; A. III, 6; P. 14; V. I, 5.

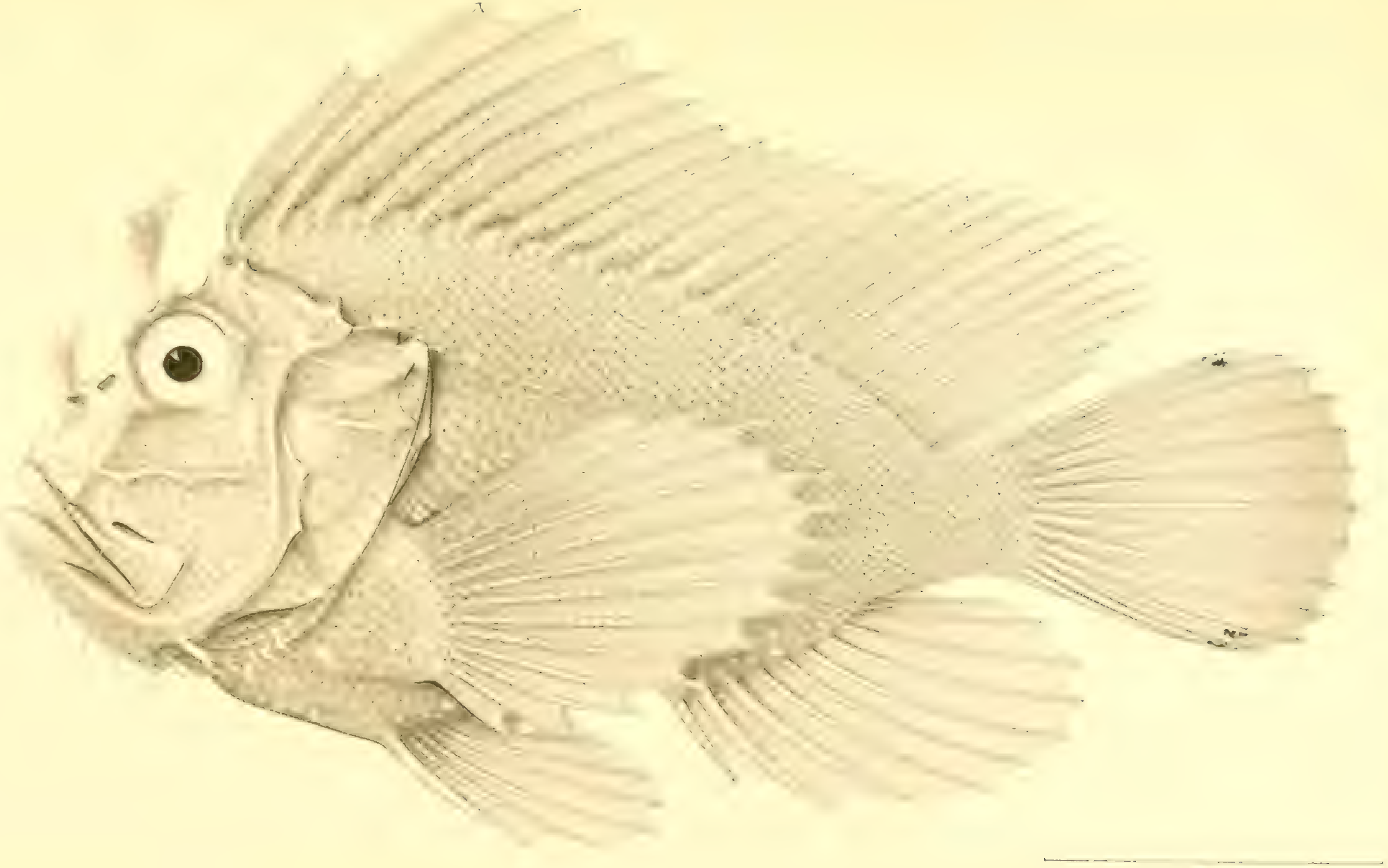
Body closely and everywhere about equally compressed; head scarcely wider, with vertical sides; eye immediately below upper profile; orbital rim elevated; interorbital space gently concave; three short but strong spines on supraorbital rim, the posterior the longer; two short strong spines on each side of occiput, one external and a little posterior to the other; two small weak suprascapular spines; opercle with 2 weak curved and diverging ridges, each ending in a weak spinous point; preopercle with 2 small triangular spines above angle, and a very small one below; preorbital crossed by 3 low ridges, which intersect at a common point, one running downward and forward from orbit and parallel with upper contour of snout, the second forming the anterior continuation of the suborbital ridge, the third intersecting the second nearly at a right angle, each ridge ending in an inconspicuous spinous point; nasal spines strong, closely approximate; a pair of very large supraorbital flaps reaching, when depressed, to base of first dorsal spine, each long and narrow, with its margin sparsely fringed; a large fringed cirrus arising from posterior margin of anterior nostril, which is in a short broad tube; when depressed, the nasal cirrus reaches to or beyond vertical from front of pupil; posterior nostril an oblong pore, close behind anterior; a short pedunculate flap on each side of tip of snout; a series of 3 long slender simple filaments on mid-gular line; a series of similar filaments along mandible; mouth very oblique, mandible included; maxillary broad, not slipping under preorbital, reaching a vertical from front of pupil; teeth villiform and very small, in narrow bands in jaws; a few slight asperities on vomer; palatines toothless; branchiostegal membranes moderately joined across throat, and free from isthmus; branchiostegal rays 7; pseudobranchiæ large; gills 3½, no slit behind last arch; gill-rakers represented by small spinous tubercles on all the arches.

First dorsal spine inserted over posterior edge of orbit, equaling in length the next to the last spine, and two-thirds the length of the third; third spine a trifle longer than second, and the longest in dorsal fin; twelfth spine a little longer than the eleventh and obviously shorter than the succeeding ray; membrane from last dorsal ray joining caudal fin so as to include basal third of second ray; first ray short and entirely included; last dorsal ray cleft to base; anal spines regularly graduated, the third equaling in length the first dorsal spine; last anal ray cleft to base; pectoral fin long and narrow, the width of its base about one-third its length, the tips of the longest rays reaching a vertical from middle of anal fin (on right side, fin of left side still longer); ventral spine inserted vertically below upper pectoral ray, somewhat in advance of the lower, the pectoral base curved downward and backward; third ventral ray longest, failing to reach front of anal by less than one-tenth its own length; inner ventral ray attached by membrane to sides of abdomen; caudal fin rounded. With the exception of the last dorsal and anal rays, which are forked to extreme base (better, perhaps, to be considered 2 rays in each case, springing from the same basal), all the rays of the vertical fins simple; second, third, and fourth ventral rays forked for a short distance near their tips, all other ventral rays and all pectoral rays simple.

Scales small, irregular, very thin, scarcely imbricated, their outlines not to be made out until the skin is dried, appearing cycloid, but each bearing at its free edge a short spine, projecting at an angle with surface of scale; on sides of head scales are reduced to small scattered prickles; tubes of lateral line 22 in number bearing no relation to the scales; lateral line straight, oblique, not curved, parallel with outline of back; no cirri along course of lateral line; basal half of pectoral fin bearing small scales, each furnished with a minute prickle.

Color lemon-yellow, clouded with pale brownish; fins darker; dorsal and caudal with reddish brown tinge; a few minute pearly spots widely scattered on sides of head and anterior part of body and on pectoral fin, a small spot of the same color crossing each pectoral ray near its tip.

One specimen only was obtained.



TÆNIANOTUS CITRINELLUS GILBERT TYPE

JULIUS BIEN & CO. LITH. N.Y.

The species of *Tænianotus* have been very insufficiently described and figured. It is by no means evident that all the specimens listed as *Tænianotus triacanthus* Lacépède are conspecific. Günther's 2 figures (Fische der Südsee, I, pl. 57, figs. A & B) differ widely in other respects besides color, and must, if correct, represent more than one species. It is impossible to identify *T. citrinellus* with any of these, or with *T. garretti* Günther, the latter from the Hawaiian Islands and described from a colored drawing only. It is represented with very broad, short pectorals, strong cephalic spines, and very short anal spines, and differs in many other important details in addition to the color.

Dendrochirus barberi Steindachner.

One young specimen from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms.

Family BEMBRIDÆ.

Bembradium, new genus.

Related to *Parabembras*, from which it differs in having much larger scales, a lateral line running near middle of body (as in *Bembras*), not parallel with the back, and a short mandible included within the upper jaw.

Bembradium Gilbert, new genus of *Bembridæ* (*roseum*).

Bembradium roseum, new species. Plate 82.[a]

Type, 90 mm. long, from station 3859, Pailolo Channel, depth 138 fathoms; type, No. 51617, U. S. Nat. Mus.

Head 40 hundredths of total length without caudal; depth 18; width of snout 14; length of snout 13 (to front of eyeball); eye 11; interorbital width 2; maxillary 18. D. IX–12; A. 11; V. I, 5; P. 25. Lateral line 28; 3½ horizontal series of scales above lateral line.

Body elongate, gently compressed along dorsal region; head narrow, depressed, with long snout; lower profile perfectly straight from tip of snout to tail, upper profile gently and evenly curved, highest under spinous dorsal; mouth horizontal, lower jaw shorter than upper and included within it when the mouth is closed, maxillary reaching slightly beyond front of pupil; teeth uniformly minute, forming narrow bands in jaws and on vomer and palatine bones; interorbital space a very narrow groove, the raised margins of which are minutely serrate with backwardly directed teeth; they are nearly parallel, diverging gently forward and continuing to middle of length of snout, and diverging posteriorly more rapidly, not continuing behind line of orbits; a strong triangular backwardly directed spine immediately in front of orbit and behind posterior nostril; nasal bones curved, channeled, the raised margins with uniform small teeth directed backward; a low ridge traversing cheeks from preorbital to upper portion of preopercle, passing anteriorly to the inner side of a low sharp ridge which runs the length of the preorbital; suborbital ridge rising posteriorly, almost uniformly serrate with backwardly directed teeth, 18 to 20 in number, a few of the posterior teeth only becoming slightly larger; where the suborbital ridge joins the preopercle the margin of the latter is abruptly produced to form a sharp triangular prominence which bears a double spine but little larger than the last of the suborbital series; below this, the margin of the preopercle bears 3 or 4 small spinous points, confined to the region above the angle; opercle with 2 curved diverging ridges, ending each in a spine; upper rib curving around a thinner semicircular portion of membrane at upper end of opercular flap; seen from above, this has a pore-like appearance, and functions as does the pore in *Callionymus;* top of head with short ridges ending in spines, an occipital pair, one behind each eye, and 2 pairs on post-temporals; gill-openings widely cleft, the membranes wholly free from each other; gills 3½, the laminæ very narrow; a wide slit behind last gill-arch; gill-rakers short but strong, the longest about ½ diameter of pupil, decreasing in length anteriorly from angle of arch; 6 on horizontal limb of outer arch, the anterior 1 or 2 rudimentary and immovable; branchiostegal rays 7.

First dorsal short, of sharp moderately strong spines, the third spine longest, 16 hundredths of length to base of caudal; base of first dorsal 19; base of second dorsal 30; space between dorsals 2; first ray of soft dorsal simple, all the other rays forked for distal third or fourth of their length, last ray split to base; anal base 27 hundredths of length; first 2 anal rays simple, others forked near tips, the last divided to base; none of the lower pectoral rays modified; some of the upper rays longest, 24 hundredths of length; lower rays progressively shortened, the base obliquely procurrent; a few of the longer middle rays forked, but most of them simple; ventral fins inserted slightly in advance of lower base of pectorals; ventral spine strong, half the length of the third ray, which is the longest, 17 hundredths of length; all ventral rays forked; caudal truncate or slightly rounded, the rays all forked, except the shortened procurrent rays at upper and lower margins of the fin.

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[a] By error labeled *Bembradium roseus* on plate.

Scales very large, those above lateral line in series parallel with the back; scales marked with very fine concentric lines having their center near the free margin; they have no radiating striæ, but the free margin is densely beset with short spines; scales thus not of the normal type, having the pectination ctenoid and the concentric rings cycloid, though the center of the rings is again abnormal in position; scales below lateral line much smaller than those on back, and becoming still smaller on belly and breast, where their margins are mostly entire; cheeks, opercles, and occiput scaled, snout and jaws naked; small scales also covering bases of caudal and pectoral fins; lateral line descending in a curve to middle of sides, which it reaches under middle of soft dorsal.

Color in life, reddish above, over an olive ground; belly whitish; the red color intensified on cheeks, on opercles, in a blotch under spinous dorsal, one under soft dorsal and one on caudal peduncle; soft dorsal and caudal barred with red, and translucent, anal and spinous dorsal uniform red; pectorals marked with irregular red blotches; ventrals silvery, tinged with red.

In the cotype, 86 mm. long, from the same locality, there are 29 scales in the lateral line, and 24 rays in each pectoral fin. No other differences have been detected.

Only 2 specimens secured.

Family PERISTEDIIDÆ.

Peristedion hians Gilbert & Cramer.

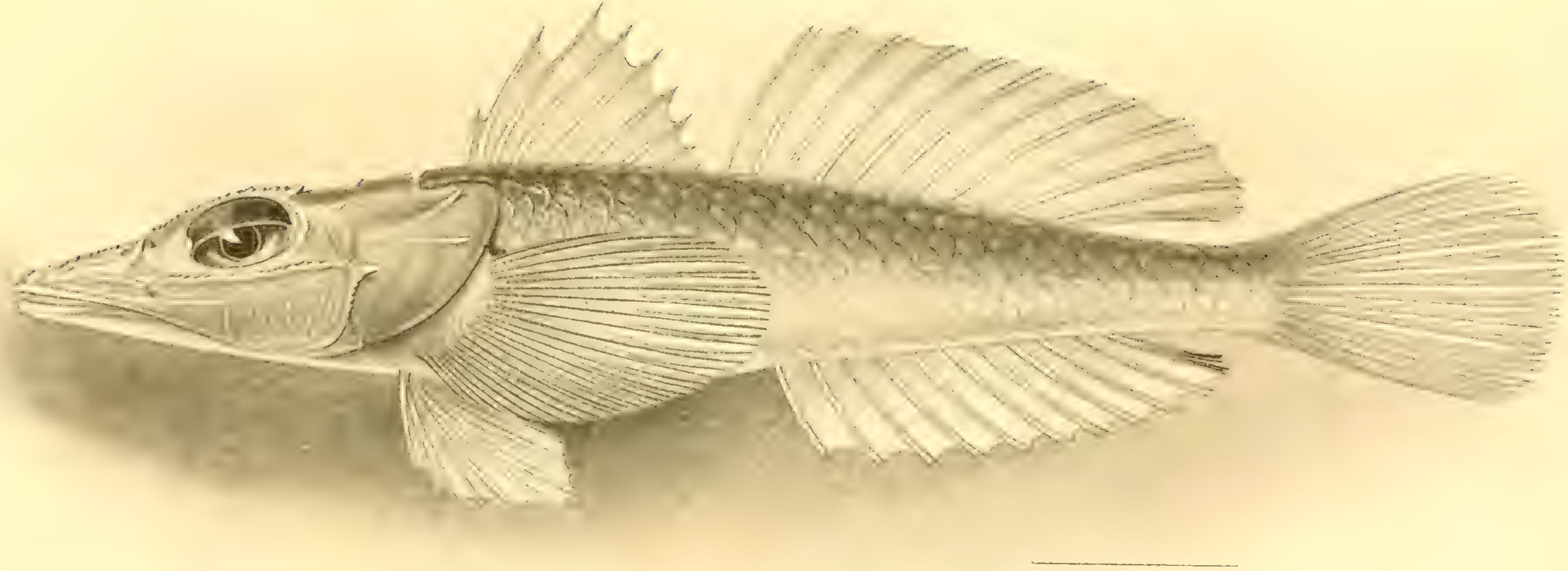
Frequently taken in depths of 225 to 350 fathoms, but never in large numbers. The following details may be added to the original description: Length of head contained 2.65 to 2.75 times in length. Of 10 specimens examined as to fin rays, 7 have D. VII, 21, A. 21; 2 specimens have D. VII, 21, A. 22; 1 has D. VII, 22; A. 22. Last dorsal spine attached by membrane to first soft ray, the notch between the 2 apparently deepest in adults. First 5 or 6 plates accompanying lateral line forming a short convex curve above pectorals. Mandibular joint opposite, or slightly in advance of, anterior third of orbit; spinous plates on mandibular rami compressed, attached by their edge; gill-rakers 4 + 22 in number, 2 or 3 at either end of series reduced to soft papillæ; 8 very short thick pyloric cæca; ovaries united posteriorly. The stomach contains the remains of small crustaceans, together with much that is unidentifiable.

Color in life dull reddish, young with much dusky marking, which is especially developed along margins of plates on head and body Adults nearly uniform clear red. Spinous dorsal black; pectorals black, narrowly margined with white in young, in adults dusky in distal half only.

In young specimens, the lateral margins of the head show usually 2 projections which disappear with age, one below anterior border of orbit, the other below posterior border; all the spines of the head are much higher in the young, the interorbital space appearing more deeply concave. Immediately above the long preopercular spine, there develops usually in older individuals a slender spine directed upward and backward.

The species was taken at the following stations: Nos. 3839, off the south coast of Molokai, 259 to 266 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3919, off the south coast of Oahu, 220 to 257 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 3988, vicinity of Kauai, 165 to 469 fathoms; 4001, vicinity of Kauai, 230 to 277 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms; 4134, vicinity of Kauai, 225 to 334 fathoms; 4136, vicinity of Kauai, 294 to 352 fathoms.

Peristedion hians Gilbert & Cramer, Proc. U. S. Nat. Mus. XIX, 1897, 419, pl. XLI, figs. 1, 2.



BEMBRADIUM ROSEUS GILBERT. TYPE.

Peristedion engyceros (Günther).

This species has been known hitherto only from the type, which consisted of fragments of a dried specimen sent from the Hawaiian Islands to the British Museum. The investigations of the *Albatross* have now shown it to be abundant about the islands on sandy bottom at depths of 150 to 250 fathoms, about 60 specimens being secured at 17 stations. The following description is based upon this material.

Length of head, measured from front of premaxillaries to opercular margin, 2.5 in length from front of premaxillaries to base of caudal; depth 5.75; greatest width of head 3.65. D. VII, 20 (rarely 21); A. 20; P. 14 + 2.

The species differs strikingly from *P. hians* in the shape of the rostral processes, which are very slender, parallel, of nearly equal width throughout; the distance between them equals their length, and is about half length of snout without them; width of the snout opposite anterior nostril equal to its length; interorbital space deeply concave, with a median groove, which widens posteriorly; a small postocular spine, a much stronger spine at end of occipital ridges, and small spines at end of paroccipital opercular crests; upper orbital rim spinulose along its entire length; in the young are usually 2 preorbital spines which disappear in adults;. behind snout, the lateral margins of head are expanded to form a thin knife-edge, which leads to the long preopercular spine; the anterior limit of the expanded edge marked by a projecting spine, to the base of which runs a vertical ridge from front of eye and an oblique ridge from middle of lower orbital margin; all the plates of the head minutely prickly; on median portion of snout 6 or 8 stronger hooked spines, distributed on the rostral ridges; interorbital width 0.65 diameter of eye, which is contained 4.4 times in head; premaxillaries protruding beyond mandible for a distance equal to 0.2 length of head; length of maxillary contained 2.3 times in head, and equal to the greatest external width at angles of mouth; the large barbel, when laid back, extending to base of ventral fins; along its anterior margin it bears a series of smaller barbels, mostly arranged in pairs; seven barbels, similar to these smaller ones, occurring on each side of symphysis, on lower lip and adjacent portions of mandible; the most posterior of these, on the mandible, is always paired; mouth toothless; gill-rakers 5 + 16 or 17, the terminal ones represented by papillæ; spinous dorsal joined to soft dorsal at extreme base; pectorals long, reaching fifteenth plate along lateral line, length of upper ray equaling distance from tip of snout to front of pupil; upper free ray contained 2.25 times in head.

Dorsal series of plates with strong backwardly-hooked spines which decrease in size posteriorly, almost disappearing on caudal peduncle; behind these 2 movable spines along base of upper caudal lobe; the upper lateral series of plates accompanies the lateral line, which opens externally in 3 pores for each plate, 1 above and 2 below the spine; behind the short anterior arch the spines are strong; 9 to 12 spines in front of middle of caudal peduncle bear at the base of the anterior side a short, strong, straight spine, directed obliquely forward; spines of ventral row of plates obsolescent, perceptible to the touch, but scarcely visible along course of anal fin; only 2 or 3 of the anterior plates of the series have well-developed spines. Dorsal series containing 29 or 30 plates, including 2 on base of caudal; 34 or 35 in upper lateral, 23 or 24 in lower lateral series, and 26 or 27 in ventral series, including 2 on base of caudal.

A specimen in life was pink, with a yellowish tinge, the tips of rostral processes, the fins and long barbels deeper pink or almost scarlet, the tips of fins and ends of barbels white; breast and belly white; upper parts of head and body marked with fine olive dots and lines, those on head arranged regularly and symmetrically; some specimens appear nearly or wholly plain, without spots and lines; pectorals whitish, streaked or spotted with olive; anal marked with 3 indistinct narrow yellowish vertical bars; other fins unmarked.

The species was taken at the following stations: Nos. 3919, off the south coast of Oahu, 220 to 257 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 3938, vicinity of Laysan, 148 to 163 fathoms; 3941, vicinity of Laysan, 70 to 146 fathoms; 3957, vicinity of Laysan, 173 to 220 fathoms; 3986, vicinity of Kauai, 55 to 362 fathoms; 3993, vicinity of Kauai, 201 to 218 fathoms; 4017, vicinity of Kauai, 305 to ? fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4080, off the north coast of Maui, 178 to 202 fathoms; 4081, off the north coast of Maui, 202 to 220 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4083, off the north coast of Maui, 238 to 253 fathoms; 4115, off the west coast of Oahu, 195 to 241 fathoms; 4116, off the west coast of Oahu, 241 to 282 fathoms; 4117, off the west coast of Oahu, 253 to 282 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Peristethus engyceros Günther, Proc. Zool. Soc. Lond. 1871, 663; Günther, Fische der Südsee, 168 (text figure).

Family HOPLICHTHYIDÆ.

Hoplichthys citrinus, new species. Fig. 249.

Type, a male, 175 mm. long, from Albatross station 3859, Pailolo Channel, depth 138 fathoms; No. 51610, U. S. Nat. Mus.

Very close to *H. langsdorfii* Cuvier & Valenciennes, from Japan, agreeing with that species in general proportions and in number of plates and fin rays. It differs in coloration, in the production of larger spinous lobes along lateral contour of head, in certain minor differences in the sculpturing of the lateral plates and the bones of the head, and in the shape of the fins.

Length of head 32 hundreths of total length without caudal; greatest width of head, at base of spinous ridges 22; depth of head 9; diameter of orbit 8; interorbital width 1.7; length of snout 11; length of maxillary 12; length of first dorsal spine 21; length of second dorsal ray 46; longest pectoral ray 22; longest ventral ray 12.5. D. vi–15; A. 17; P. 13 + 3; V. i, 5. Lateral plates 27.

Head greatly flattened; snout wide, spatulate, its longitudinal profile concave; lateral profile of head formed by a sharp dentigerous ridge, divided into 4 well-marked lobes: a preorbital lobe, a short lobe below front of eye, a greatly expanded rounded lobe below cheeks, and a fourth lobe constituting lower margin of opercle and ending in the very long curved preopercular spine; in *H. langsdorfii* the lobes are much less expanded and convex, this being especially noticeable in the one on the cheeks, between which and the preopercular lobe is but an inconspicuous notch.

Interorbital space very narrow, channeled, the margins minutely denticulate; minutely toothed areas and ridges on snout, cheeks, opercular bones, and occiput; these regions somewhat less rough than in *langsdorfii* and the toothed area on the prefrontal wider; a short series of spinelets on interopercle, behind angle of mouth, and others on lower side of preorbital; opercle marked by 5 to 8 rough striæ, which diverge from the upper anterior angle; the strongest of these ribs ends in the long opercular spine; a short strong humeral spine present; broad bands of minute villiform teeth on jaws, vomer and palatines; lower jaw shorter than upper, everywhere included; maxillary extending backward to a vertical which intersects orbit midway between front of orbit and front of pupil; gills very small, laminæ extraordinarily short, scarcely longer than the transverse diameter of gill-arch; a single series of filaments on inner arch, which has no slit behind it; 10 or 12 short gill-rakers on horizontal limb of outer arch; pseudobranchiæ well developed; branchiostegal rays 7, the membranes broadly united below to isthmus, without free fold; lower ends of gill openings separated by a distance equaling 0.15 length of head; by the great production of the opercular flap, the upper end of the gill-slit appears as a small round pore on the upper aspect of the greatly flattened head, resembling the branchial pore in *Callionymus*, but this pore is simply the upper end of the wide slit.

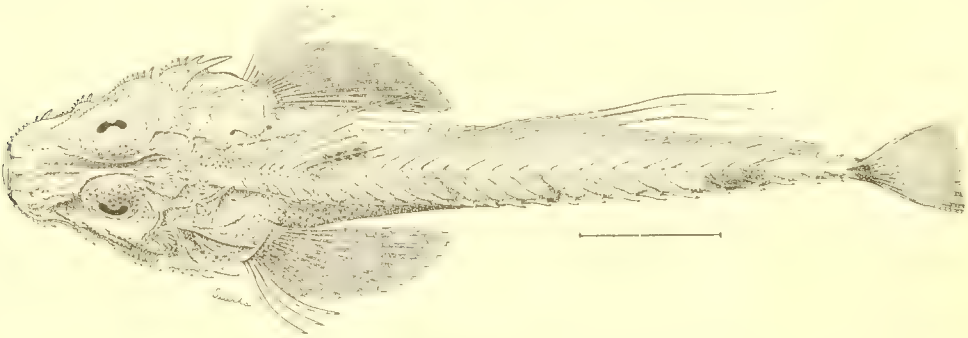


FIG. 249.—*Hoplichthys citrinus* Gilbert, new species. Type.

Dorsal fins greatly elevated in the males, as is also the case in *H. langsdorfii*, but the details in the 2 species are widely different. In *H. citrinus*, the first dorsal spine is produced and filamentous, sometimes extending well beyond origin of soft dorsal, the upper margin of the fin deeply concave; some or all of the first 4 rays of soft dorsal are still more produced and filamentous, one or more of them in extreme cases reaching, when declined, beyond base of fin; the succeeding rays are entirely included in the membrane and are equal in height, their length half that of head; a few of the posterior rays are shortened; last dorsal and last anal rays are cleft to the base; except the modified pectoral rays and a few at base of caudal lobes, all rays are forked, those of the anal fin near extreme tip only; in males of *H. langsdorfii*, there are no filamentous or free rays; the spinous dorsal has a convex outline, and some of the middle rays of the soft dorsal are the highest in the fin; anal rays not specially produced in males of either species; in *H. citrinus*, the caudal is truncate or slightly concave, this being more marked in males, where the lower caudal rays are a little longer than the upper. In *langsdorfii*, the caudal is convexly rounded in both sexes; the lower 3 (or rarely 4) pectoral rays are simple, thickened and longer than the rays immediately above them; they are largely free, being joined to one another and to the rest of the fin by a very low membrane at extreme base. They resemble strikingly the free pectoral rays of *Trigla*. The ventral fins are subjugular in position, their insertion being in advance of pectorals; they contain 5 branched rays in addition to the spine, the inner ray the longest, the others progressively shortened. Cuvier and Valenciennes have erroneously figured the ventrals as rounded in *H. langsdorfii*.

The fin rays are very constant in this species. We have found but 2 variations from the normal formula, the dorsal spines numbering but 5 in one specimen, the free pectoral rays increased to 4 on one side of another specimen.

The body is naked, with the exception of the series of lateral plates, which agree in structure and in number with those of *H. langsdorfii*. These plates are placed obliquely antero-posteriorly, the anterior upper portion nearly horizontal, its surface roughened by from 2 to 5 minutely denticulated ridges, the lower posterior part vertical and smooth. At the angle each of these plates is provided with a very strong spine directed backward. In this species and in *langsdorfii* a minute concealed spinous point can be detected below and behind the strong spine, but in no specimen have we seen the pair of equally strong spines figured by both Cuvier and Valenciennes and by Temminck and Schlegel, as characteristic of *langsdorfii*. The pores of the lateral line occur below the spinous crest in the soft intervals between the vertical laminæ. The plates are always 27 in number in both species.

Color in life very bright lemon-yellow or olive-yellow on all upper parts, including fins, white or silvery below, the boundary between the 2 colors coarsely freckled with brown spots, which cover also more or less of the back; faint traces of 4 dark cross-bars on back, seldom evident except in the young; soft dorsal translucent, with many round yellowish green spots; a basal series larger than the others, with each spot nearly half as large as pupil; a large black blotch at base of posterior dorsal spines; anal fin with a terminal orange band, but without black margin; upper margin of spinous dorsal orange; caudal with some orange,, its base and terminal portion dusky. In one very young specimen, 95 mm. long, there is a broad black bar through the middle of the spinous dorsal; five dusky cross-bars are evident: 3 wide bars opposite spinous dorsal, middle of soft dorsal and end of soft dorsal, respectively, and 2 narrow bands, intermediate in position between the wide bars; there is also a very narrow subterminal dark line on the anal fin, similar to but fainter than that characteristic of adult specimens of *langsdorfii*. In no other specimen of *citrinus* is there a trace of the anal band.

In the stomach of one specimen were found remains of crabs and fishes. The specimens of *H. langsdorfii* with which we have compared *citrinus* were dredged by the *Albatross* May 11, 1900, at station 3717, off Hondo Island, Japan, at a depth of 75 to 100 fathoms. A specimen of the same species is at hand from Kagoshima. These differ somewhat from current descriptions and figures of *langsdorfii*, but probably belong to that species.

Specimens were taken at the following stations during the Hawaiian investigations: Nos. 3858, Pailolo Channel, 128 to 138 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 3965, near Laysan Island, 116 to 147 fathoms; 4079, off the northeast coast of Maui, 143 to 178 fathoms; 4080, off the northeast coast of Maui, 178 to 202 fathoms; 4081, off the northeast coast of Maui, 202 to 220 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms; 4114, off the northwest coast of Oahu, 154 to 195 fathoms; 4120, off the northwest coast of Oahu, 167 to 216 fathoms.

Hoplichthys platophrys, new species. Fig. 250.

Type, a specimen 70 mm. long, from station 3952, near Laysan Island, depth 351 fathoms; type, No. 51620, U. S. Nat. Mus.

Differing from other known species of *Hoplichthys* in the small eye, wide interorbital space, the more complete union by membrane of the modified lower pectoral rays, and the weaker spines on head and lateral plates.

Head 37 hundredths of total length without caudal; greatest width of head, at base of spine-bearing ridges 28; diameter of eye 7; interorbital width 5; length of snout 13; length of maxillary 15. D. vi–15; A. 18; P. 13 + 3; V. i, 5. Plates 27.

Snout somewhat broader and more squarely truncate than in *H. citrinus*; eye very small; interorbital space much wider. The general spination of head agrees with *H. citrinus*, but the type is too young for a determination of details; spines along suborbital ridge, as well as those elsewhere on head, smaller than in *citrinus*, and not forming expanded lobes as in that species; mouth similar, with lower jaw shorter, the maxillary reaching a little past front of orbit; teeth very minute, but distinguishable in very narrow bands on jaws, vomer and palatines; branchiostegals 7.

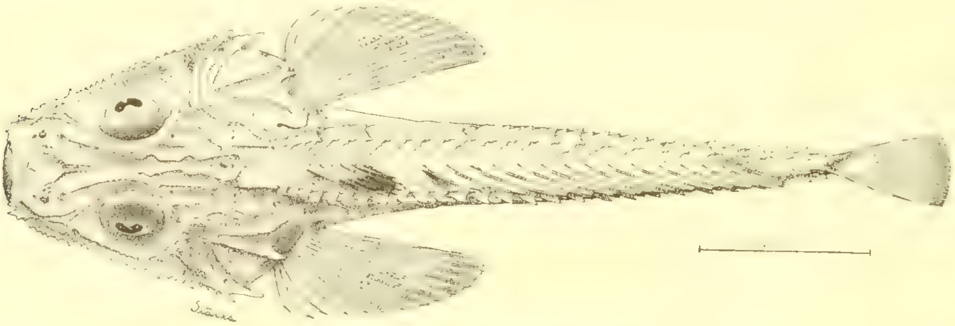


FIG. 250.—*Hoplichthys platophrys* Gilbert, new species. Type.

The structure of the fins is wholly like that of *H. citrinus*, except that the lower 3 pectoral rays are joined by membrane to one another and to the rest of the fin for more than half the length of the rays. In our smallest *citrinus*, 96 mm. long, there is no approach to this condition.

The plates agree in number and structure with the other species of the genus. There is a strong spine at the angle of each plate, with a small concealed one below and in front; the upper half of each plate contains a single denticulate ridge running downward and backward, the lowermost tooth on the ridge longer than the others. Young *citrinus* have also a single spinous ridge on upper half of each plate, the number of ridges increasing with age.

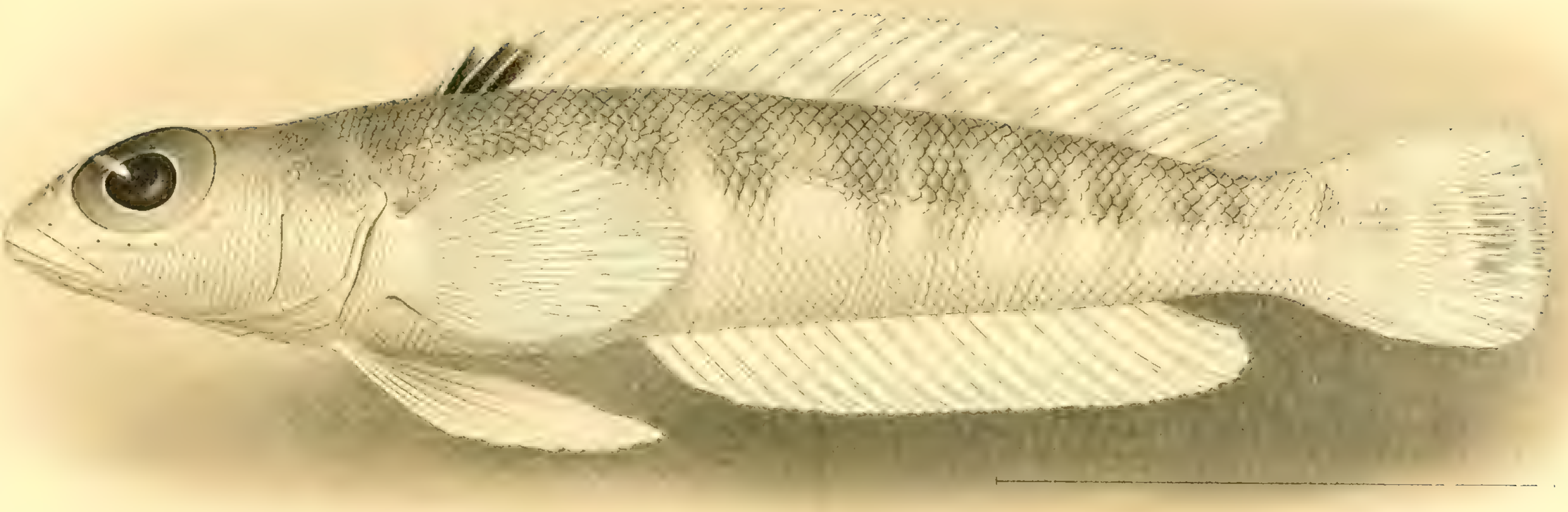
Color in spirits, light olive, without white or silvery pigment; 3 broad and 2 narrow bars on back, as in young of *citrinus* and in adults of *langsdorfii*. In *platophrys*, the bars below soft dorsal end each in a black blotch, below lateral plates. Head with some dusky markings above, and 3 small black spots below suborbital ridge; pectoral with dusky mottlings; spinous dorsal with a broad black bar occupying all but base of anterior rays, and a narrow white margin; soft dorsal with a dusky spot near base of each ray, and a dusky subterminal band; anal with a wide black submarginal band, edged with white; caudal with a dusky terminal band.

Only the type known.

Family PTEROPSARIDÆ.

Osurus schauinslandi (Steindachner).

Several specimens, mostly immature, were dredged in depths of 14 to 90 fathoms. Young specimens are more uniformly colored than adults, have the caudal emarginate but not deeply forked and the lobes not produced; the ventral fins are greatly produced, much longer than in adults, reaching base of fourth or fifth anal ray. In adults, the ventrals fail to reach origin of anal.



NEOPERCIS ROSEOVIRIDIS GILBERT. TYPE

The species was taken at the following stations: Nos. 3849, off the south coast of Molokai, 43 to 73 fathoms; 3850, off the south coast of Molokai, 43 to 66 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4002, vicinity of Kauai, 53 to 230 fathoms; 4024, vicinity of Kauai, 24 to 43 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms; 4073, off the north coast of Maui, 69 to 78 fathoms; 4075, off the north coast of Maui, 49 to 57 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms; 4158, vicinity of Bird Island, 20 to 30 fathoms.

Parapercis pterostigma Jenkins, Bull. U. S. Fish Com. for 1899 (1901), 402.

Neopercis roseoviridis, new species. Plate 83.

Type, 71 mm. long, from station 4077, off the northeast coast of Maui, depth 99 to 106 fathoms; type No. 51650, U. S. Nat. Mus.

Most nearly allied to *N. multifasciata* Döderlein, from Japan, differing most conspicuously in the much larger eye and in the color.

Head 30 hundredths of total length, without caudal; depth 19; depth of caudal peduncle 9; maxillary 11; snout 7; eye 12; interorbital width 2. D. v–23; A. 20; P. 19 or 20. Lateral line with 55 pores (60 oblique rows running downward and backward above it); 21 scales in a cross-series from front of anal fin.

Head wide and much depressed at occiput; snout short and rounded; mouth oblique, maxillary reaching vertical from front of pupil; narrow band of villiform teeth in upper jaw, the outer series enlarged, especially anteriorly; lower jaw with a narrow band of villiform teeth anteriorly, which tapers laterally to a single series of larger teeth; a short series of enlarged teeth in a straight line in front of symphyseal part of mandibular band; a single series on vomer and palatines; a single strong opercular spine, head otherwise unarmed; gill-membranes broadly joined across throat, with a posterior free margin; branchiostegal rays 6, as in *multifasciata*.

Dorsal spines regularly graduated, the fourth and longest spine united fully by membrane to first soft ray; last dorsal ray reaching caudal base when declined; pectorals reaching vertical from first anal ray, ventrals to base of third anal ray; caudal gently convex.

Scales ctenoid, except on breast and abdomen; present on cheeks and opercles, but lacking on rest of head; lateral line convexly curved in its anterior portion, reaching axis of body at about middle of trunk.

Ground color light rose above, crossed by 5 pairs of broad brownish green bars, a single narrower dark bar across the nape; these bars correspond in position with the much narrower black bars of *multifasciatus*; no black spot at base of caudal; spinous dorsal largely black; three ill-defined cross-bars on median caudal rays; fins otherwise unmarked.

A cotype from the same station is 62 mm. long, and has the dorsal iv–23; anal 20; pectoral 19 or 20; scales in lateral line 57. Only 2 specimens obtained.

N. *multifasciata* is described and figured as having 5 dorsal spines. In 6 specimens examined, 4 have 4 spines, 2 have 5 spines.

Bembrops filifera, new species. Plate 84.

Type, a male, 223 mm. long, from station 4080, off the northeast coast Maui, depth 178 to 202 fathoms; type, No. 51613, U. S. Nat. Mus.

Differing from *B. caudimacula* Steindachner in the much smaller scales, and from all known species in the filamentous first dorsal spine and the coloration.

Head 37.5 hundredths of total length (caudal excluded); snout 13; eye 8; maxillary 14.5; interorbital width 1.3; greatest depth 12; least depth caudal peduncle 5.5. D. vi–14; A. 18; P. 26 and 27; V. i, 5. Scales in lateral line 64 or 65, 6½ between lateral line and anterior dorsal rays.

Snout very long, depressed, spatulate, longitudinal, concave, resembling a duck's beak; mandible very projecting, dentigerous area at tip protruding above upper profile of snout; cleft of mouth a little oblique; maxillary reaching a vertical little in advance of pupil, and bearing at tip a long narrowly triangular fleshy flap; teeth villiform, everywhere in bands, inner teeth always longer, curved, readily depressible; premaxillary bands greatly widened anteriorly, a wide naked area separating them mesially; teeth also continued around on exposed surface of premaxillaries, and visible from above; vomerine patch divided into 2 portions by a naked mesial furrow, the very long narrow palatine bands abutting against the posterior end of each lateral half; posterior nostril a roundish or oblong pore in middle of length of snout; anterior nostril a round pore in a short tube, which is prolonged at the inner side to form a flap, and is separated from posterior nostril by $\frac{1}{7}$ length of snout; the narrow interorbital width gently concave; gill-membranes separate, the right side overlapping, the anterior end of gill-slit well in advance of eye; branchiostegal rays 7; large pseudobranchiæ present; gills 4; posterior series of filaments on fourth arch shortened; a wide slit behind fourth arch; gill-rakers slender, toothed, 13 in number on horizontal limb of outer arch, the longest one-fourth diameter of eye; angle of preopercle with 2 closely apposed short spines, the angle projecting, the margin above angle concave. As in other species, there are 2 opercular spines and one subopercular spine, the latter and the upper opercular spine of equal length, the lower opercular spine shorter; a single strong suprascapular spine above origin of lateral line; the 5 anterior scales of lateral line bear each a strong median crest on the summit of the tube, but are not armed with spines.

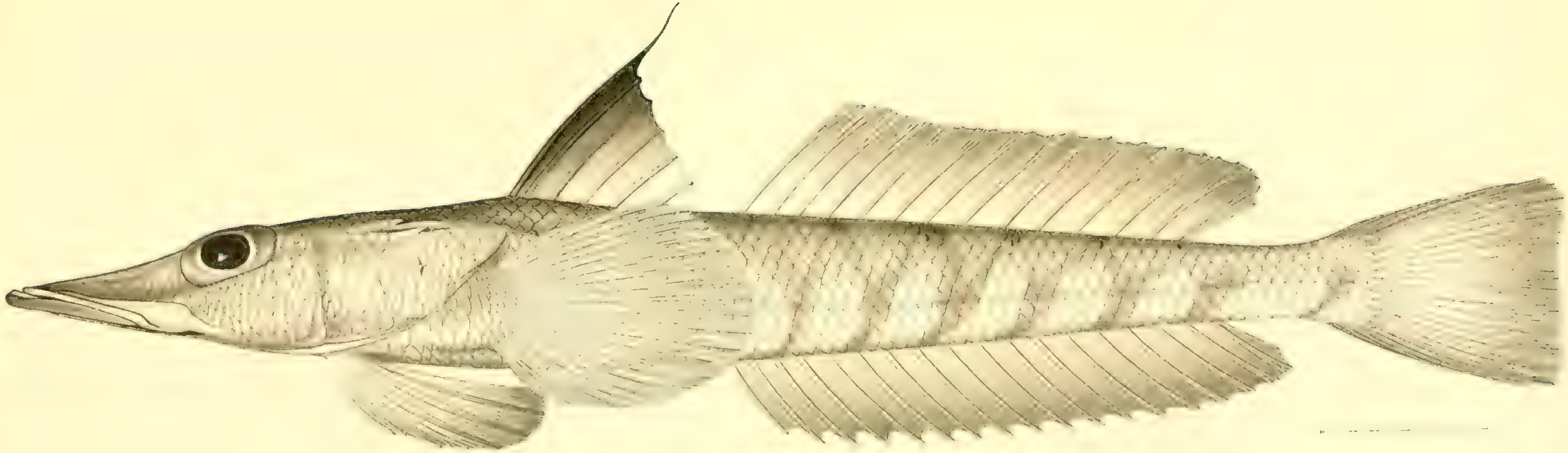
Origin of spinous dorsal above tip of opercular flap, its distance from tip of snout 38 hundredths of length to base of caudal; spines very slender and flexible, the anterior produced far beyond outline of fin, forming a filament which extends to base of third ray of soft dorsal and is 19 hundredths of the length; second spine (13 hundredths) when declined reaching tips of last 2 spines, and well separated from first dorsal ray; third and fourth spines, when declined, failing to reach tips of last spines; outline of fin slightly concave; first ray of soft dorsal longest (12 hundredths), and forked at tip as are all succeeding rays; last ray cleft to base; distance (6.5 hundredths) between last dorsal spine and first soft ray is two-fifths occupied by the membrane from the spine; anal fin beginning slightly before dorsal and ending slightly behind it, all the rays simple except the last, which is cleft to base; caudal gently rounded; middle pectoral rays longest (19 hundredths), their tips reaching vertical from second dorsal ray; ventral spine (6.5 hundredths) strong and curved, well separated from adjoining ray by movable membrane; fourth ventral ray longest (14.5 hundredths), reaching half the distance from its base to second anal ray.

Scales caducous and lost over the greater part of the head and body, most persistent along lateral line; they are thickly beset with short spines on margins, their exposed surfaces marked with fine concentric lines, which center near the free margin of the scale; scales smooth on breast and abdomen and along base of anal; their character on head can not be determined; a single series of scales on proximal part of dentary, one series on maxillary; the gular and gill membranes, and a narrow median tract on anterior half of snout naked; rest of head closely scaled.

Lateral line first curved upward toward origin of spinous dorsal, then gently decurrent, reaching its lower level opposite fourth anal ray; 5 or 6 scales between lateral line and front of soft dorsal; 4 scales between lateral line and middle of anal base; 9 series of scales between occiput and first dorsal spine.

Color in spirits, light olive brown on body, grayish on occiput, snout and opercles; upper part of eye black; iris margined with green in front and behind; a golden-green spot on anterior part of preopercle, a fainter one on the flap; very faintly marked greenish yellow blotches on back opposite third dorsal spine, third dorsal ray, and ninth dorsal ray; on lower half of side 9 conspicuous purplish dusky bands, narrower than the interspaces, running obliquely downward and forward, and reaching to or almost to base of anal; two of these bands are in front of anal fin, and do not reach midventral line; on dorsal half of body, these bars become obscure and the pattern is not evident; 2 or 3 of them, under soft dorsal, fork just above the lateral line, the branches diverging widely and reaching base of dorsal; anterior half of spinous dorsal black; soft dorsal with a vertical blackish streak lengthwise of distal half of each interradial membrane, becoming more intense toward margin of fin; tips of rays white; anal uniformly dusky; middle caudal rays whitish, dusky toward margin, with narrow whitish tips, the upper and lower rays dusky; a poorly defined small black spot on basal portion of some of the upper rays; pectorals dusky with lighter base and margin; ventral membrane blackish in distal portion, the rays white.

In the cotype, 53 mm. long, from station 4079, northeast coast of Maui, depth 143 to 178 fathoms, the fin rays are as follows: Dorsal VI–15; anal 17; pectoral 27; ventral I, 5; scales 59 to 62. In this immature specimen, the first dorsal spine scarcely protrudes beyond the other spines, the bars are confined to a series of short blotches along lateral line, and the black spot near base of upper caudal rays is very intense and conspicuous, oblong-oval, and ocellated with whitish; peritoneum jet-black. Two specimens obtained.



BEMBROPS FILIFERA GILBERT TYPE

Chrionema, new genus.

Most closely allied to *Bembrops*, from which it differs only in the absence of a fleshy flap on the maxillary. From *Pteropsaron* it differs in the ctenoid scales, the low lateral line, and the absence of the pair of strong spines pointing forward at tip of snout. The scales of the lateral line are unmodified, while in *Pteropsaron* each scale of the lateral line has its free margin produced into from 1 to 3 acute lobes.

Chrionema Gilbert, new genus of *Pteropsaridæ* (*chryseres*).

Chrionema chryseres, new species. Plate 85.

Type, a female, 206 mm. long, from station 3813, off south coast Oahu Island, depth 264 to 183 fathoms; type, No. 51655, U. S. Nat. Mus.

Head 36 hundredths of total length (caudal excluded); snout 11; eye 10; maxillary (from tip of upper jaw) 15; interorbital width 1.5; greatest depth of body 15; least depth of caudal peduncle 5.5. D. vi-16; A. 24; P. 22, 23; V. i, 5. Scales in lateral line 76 on one side, 72 on the other; 12 scales in a vertical series between lateral line and front of soft dorsal.

Snout depressed and spatulate, but its median longitudinal profile not concave; interorbital space narrow, the margins slightly raised; mandible projecting, mandibular band of teeth fitting wholly outside premaxillary band anteriorly; maxillary nearly horizontal, extending beyond anterior third of eye, without barbel or fleshy flap at tip; teeth villiform, in bands in jaws, and on vomer and palatines; premaxillary band becoming very wide anteriorly, its teeth, especially those in posterior part of band, longer, curved, and readily depressible; posterior teeth of mandibular band, and some on vomer and palatines likewise longer, curved, and depressible, the 2 halves of the vomerine band in connection across median line, forming the usual V-shaped figure; palatine bands continued farther forward than usual, so that their anterior ends overlap and lie along outer sides of posterior third of each lateral half of vomerine band; anterior nostril a rounded pore with slightly raised margin, the posterior a horizontal slit; distance separating nostrils about equal to that between posterior nostril and front of eye; gill-membranes separate, not joined to isthmus; anterior end of gill-slit in advance of tip of maxillary; gills 4; posterior series of filaments on fourth arch about half length of others; a wide slit behind fourth gill-arch; gill-rakers slender, toothed, one-tenth diameter of eye, 14 on horizontal limb of outer arch; pseudobranchiæ large; branchiostegals 7; a short strong spine at angle of preopercle, with 1 or 2 obscure spinous points above and below it; opercle ending in 2 sharp spines, the upper of which is much the longer; subopercle ending in a similar spine, which ends at about the same vertical as the upper opercular spine; no other spines or serrations on head; opercular membrane greatly produced beyond the spines, forming a scaly flap which extends beyond base of pectorals; 2 short strong "humeral" spines just above origin of lateral line; anterior scales of lateral line not spinous, as in *Bembrops platyrhynchus*.

Origin of spinous dorsal just behind head, its distance from tip of snout 38 hundredths of total length without caudal; spines very slender and flexible, the second the longest, 12 hundredths of the length, the third and subsequent spines regularly shortened; distance from base of last dorsal spine to first soft ray slightly more than half diameter of eye, but the membrane joining last spine to back extending for half this distance; there are thus but 2 free scales between the fins; first ray of soft dorsal the longest (14 hundredths), the others rapidly shortened, only the first ray simple, the last ray forked to the base; anal fin beginning in advance of soft dorsal and terminating behind its end, all the rays simple, except the last, which is forked to the base; caudal fin gently rounded; longest pectoral rays (17 hundredths) below middle of fin, those above, and especially those below the longest rapidly shortened; ventrals inserted far in advance of pectorals, vertically below preopercular angle, the third ray the longest (15 hundredths); upper 2 pectoral rays and sometimes the lowermost rays simple, the others and all the ventral rays forked.

Scales small, closely adherent, rough-ctenoid, except those on breast, which are smooth; they completely invest body, cheeks and opercles, occiput, interorbital region, and a narrow median area on basal third of snout; the remainder of snout, the mouth parts, and the whole under side of head naked; 8 series of scales are crossed by a line from preopercular angle to below middle of orbit; scales extending well on bases of pectoral and caudal fins; lateral line beginning above opercular flap, strongly declined from its origin until it approaches anterior part of anal fin, from the base of which it is separated by only 5 or 6 scales; it then runs parallel with the anal base, and regains axial line only at base of caudal fin; scales of lateral line wholly like the others, none of them bearing spines; longitudinal rows of scales converging slightly toward the back.

Color in life, olivaceous above, finely mottled with darker brown; 4 large dusky blotches on and below middle of sides, the last at base of lower half of caudal; smaller dark blotches occur in the lighter interspaces; top of head dusky, darker areas on cheeks, on anterior and upper parts of opercles, and on lips; a number of bright golden-yellow spots on upper parts; 1 on median line of occiput, 1 on anterior part of opercle, 1 on opercular flap, and 1 at origin of lateral line; the remainder are mostly arranged in cross-series on the back, and are associated with faint darker bars, which are located at origin of dorsal, under fifth dorsal spine, under fourth and tenth dorsal rays, and just behind last dorsal ray; the yellow spots constituting these bands seem arranged in 2 longitudinal series, 1 on each side along dorsal profile, the other on the level of opercular flap; in the latter series occur some faintly marked spots intermediate between the cross-bands already indicated; lower parts of head and body uniformly whitish; peritoneum blackish.

Only the type obtained.

Chrionema squamiceps, new species. Plate 86.

Type, 61 mm. long, from station 4098, off north coast Maui Island, depth 95 to 152 fathoms; type, No. 51635, U. S. Nat. Mus.

Differing from *C. chryseres* in the much more complete squamation of head, in the shorter anal fin, and in coloration.

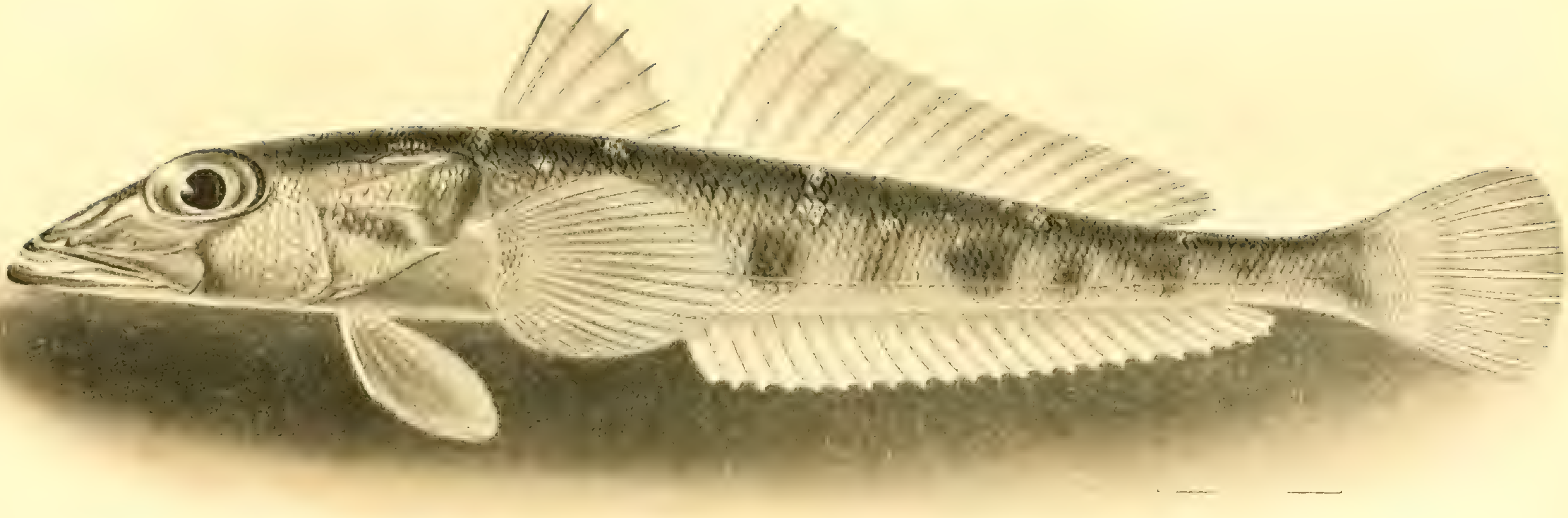
Head 35 hundredths of total length (without caudal); snout 9; eye 12; maxillary 13; interorbital width 2.3; greatest depth 14; least depth of caudal peduncle 5.5. D. VI–16; A. 18; P. 23; V. I, 5. Scales in lateral line 67 and 69 on the 2 sides; 10 in a subvertical series between lateral line and front of soft dorsal.

Snout short, flattened, longitudinally slightly concave; interorbital space narrow, transversely convex; mandible protruding anteriorly; teeth small, depressible, present on jaws, vomer, and palatines, in narrow bands except on front of premaxillaries where they form a wide patch; vomerine band not interrupted mesially; palatine patches not overlapping vomer, but lying somewhat laterally at their anterior ends; maxillary reaching vertical from front of pupil or slightly behind that point, its tip without barbel or fleshy flap; nostrils well separated, the anterior round, the posterior a horizontal slit; gill-membranes wholly separate, the left overlapping; branchiostegal rays 7; gills 4, a slit behind last arch; pseudobranchiæ large; gill-rakers longer and more numerous than in *C. chryseres*, one-fourth the size of the large eye, 18 in number on horizontal limb of outer arch; angle of preopercle with 1 or 2 inconspicuous short spines; opercle with 2 spines, subopercle with 1, the lower opercular spine shorter than the other two; 2 short "humeral" spines, as in the preceding species.

Distance of spinous dorsal from tip of snout (36 hundreths of length) slightly greater than length of head; first spine the longest (15 hundreths), the last 2 more rapidly shortened than the rest, making upper outline of fin rounded; spines very slender and flexible, the first reaching origin of second dorsal, when depressed; 3 free scales on median line between fins, 5 scales from base of last spine to first soft ray; first and all succeeding dorsal rays branched, the last forked to the base, the first ray longest (15 hundredths); last anal ray forked to base, the others simple; base of anal fin 43 hundreths of length; caudal slightly concave, with the upper lobe longer than the lower; pectoral and ventral fins agreeing in structure with *C. chryseres*.

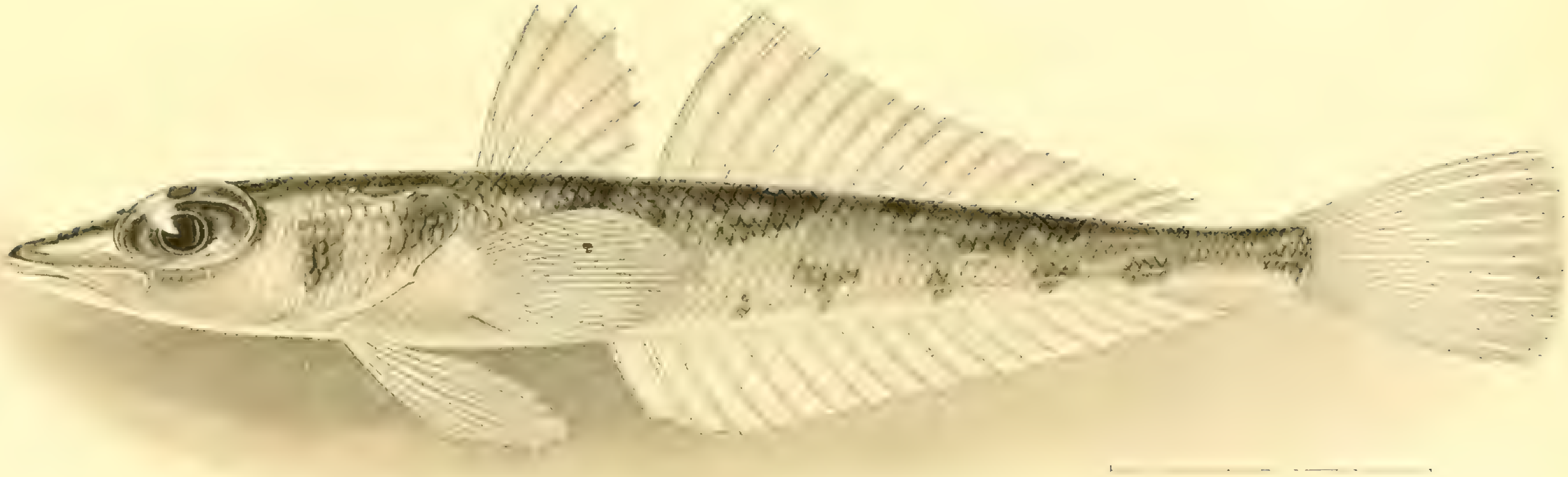
Scales slightly larger than in *chryseres*, adherent, everywhere rough-ctenoid, except on breast; as in *chryseres*, all the scales are marked with concentric rings and have no radiating ridges; head entirely scaled, except a narrow area on median line near tip of snout, the scaled portions including the preorbital, maxillary, gular membrane, mandibles, and entire lower side of head, except apparently the branchiostegal membranes; 6 series of scales between eye and preopercular angle; lateral line descending at first in a strongly convex curve to upper axil of pectorals, thence concavely to opposite anal fin; it runs parallel with the anal, separated from its base by 6 scales, and reaches axis of body only at extreme base of caudal; anterior scales of lateral line not spinous.

Ground color light olive, whitish below, a series of 3 large V-shaped blotches on and below middle of side, with a smaller spot in the middle of each interspace; a black bar at base of caudal; three dark bars, with lighter central areas, crossing the back but failing to reach middle of sides; these are

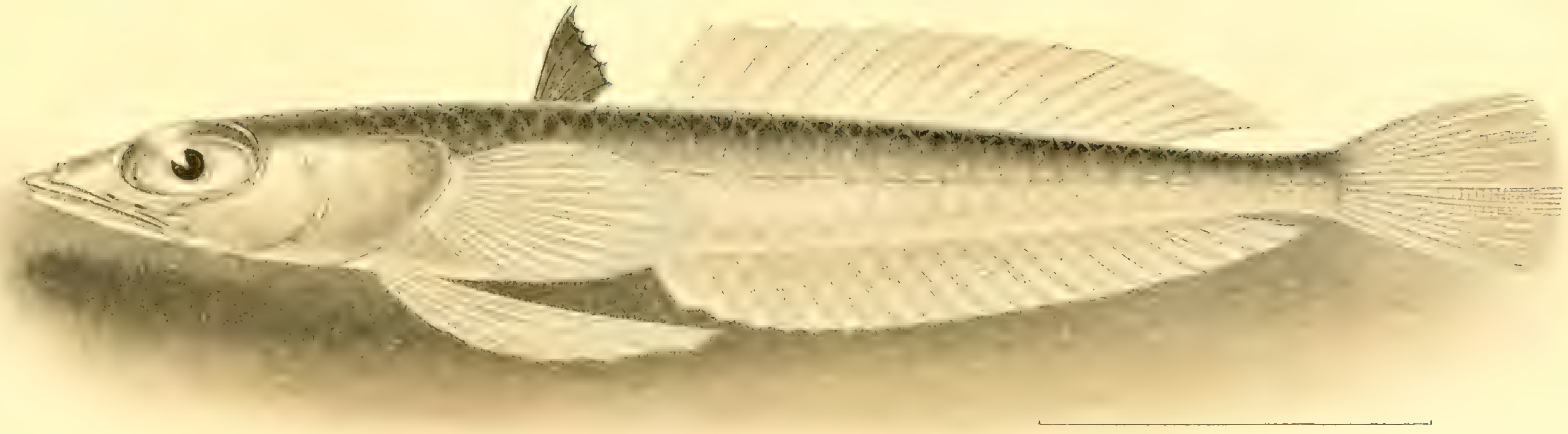


CHRIONEMA CHRYSERES GILBERT TYPE

JULIUS BIEN & CO LITH N.Y.



CHRIONEMA SQUAMICEPS GILBERT TYPE



PTEROPSARON INCISUM GILBERT TYPE

placed one behind front of spinous dorsal, one behind front of soft dorsal, and one near end of soft dorsal; a black blotch on opercular flap and a vertical one at its anterior margin; a black dot at base of each anal ray, and some dusky shading on caudal and pectorals; fins otherwise unmarked.

Only the type obtained.

Pteropsaron incisum, new species. Plate 87.

Type, 52 mm. long, from station 3957, off Laysan Island, depth 173 to 220 fathoms; type, No. 51621, U. S. Nat. Mus.

Apparently very near *P. verecundum* Jordan & Snyder, from Japan (Proc. U. S. Nat. Mus., XXIV, 1902, 472), differing in the absence of darker bands on back, and in the absence of scales on cheeks. The fin-rays, scales, and general proportions seem much the same. We find the vomer toothed, whereas *P. verecundum* is said to have it naked; but this is probably an error of observation, as teeth are present also on the vomer of *P. evolans* Jordan & Snyder, in which they are likewise said to be wanting.

Head 35 hundredths of the total length without caudal; depth 12; least depth of caudal peduncle 5; length of snout 9; length of maxillary 15; eye 11; interorbital width 1; distance from tip of snout to origin of spinous dorsal 40; distance from base of last dorsal spine to origin of soft dorsal 8; base of second dorsal 40; length of pectoral 20; length of ventrals 27. D.v–17; A. 22. Scales in lateral line 30; transverse rows 6; rows above lateral line at front of second dorsal 2.

Form elongate, widest at opercles; head not conspicuously flattened above; snout short, acute, narrowly triangular as seen from above; lower profile of head rising toward tip of snout more than upper profile descends; mouth oblique, slightly narrowing posteriorly, where it is on lower side of head; maxillary reaching vertical from middle of eye; mandible everywhere included within premaxillaries; teeth all villiform, arranged in very narrow bands in jaws; roof of mouth containing a deep longitudinal mesial groove into which fits the long narrow tongue; at its anterior end the tongue becomes suddenly dilated to form a disk-shaped process which in the closed mouth lies against the vomer; median and anterior portion of vomer toothless, but each lateral portion with a small patch of villiform teeth; vomerine teeth and groove as here described, also present in *P. evolans;* we have not been able to examine *P. verecundum* in this respect; premaxillaries very protractile; premaxillary spines extending to slightly behind front of eyes; each preorbital ends anteriorly in a strong spine directed forward, the tip of snout between the 2 spines deeply notched behind the mesial portion of the premaxillaries; the tip of snout is notched and spinous also in *P. verecundum* and in *P. evolans;* opercles slightly thickened along upper margin, terminating in a very short weak spine; bones of head otherwise unarmed; opercular membrane notched posteriorly, the portion above the notch forming a broadly rounded lobe with fimbriate margin, that below the notch produced to a point opposite middle of pectoral base; below this point, the margin entire or obscurely serrulate; branchiostegals 7, the membranes not united across throat; gill-slits continued forward to below middle of eye; gills 3½, the laminæ exceedingly narrow; gill-rakers represented by tubercles only, 10 of these on horizontal limb of outer arch; pseudobranchiæ developed.

Four dorsal spines closely crowded at base, as in *verecundum;* fin largely jet-black, but the first spine produced into a white filamentous tip which extends well beyond tips of other spines and four-fifths the distance from its base to origin of second dorsal when the fin is declined; anal originating below first ray of soft dorsal, and extending beyond its last ray; caudal rounded; ventrals narrow, not widely separated, inserted well in advance of pectorals and longer than pectorals; the third and fourth ventral rays equal, extending to base of fourth anal ray; ventral spine very short, as in *verecundum.*

Scales cycloid, with entire edges, except those forming the lateral line; in the latter, the free margins are incised to form 3 or 4 coarse teeth. Scales entirely similar in *P. evolans.* Opercles and occiput scaled, but snout, preorbitals, cheeks, and lower side of head naked.

In spirits, the color is light grayish or brownish above, without trace of darker bars; opercles and lower side of head, ventrals, and anal with much heavy white pigment; spinous dorsal black, with white filamentous tip to first spine; other fins unmarked. In life, the middle of the side was marked with 4 oblong, bright, yellowish green spots.

Taken at the following stations: Nos. 3957, vicinity of Laysan, 173 to 220 fathoms; 3958, vicinity of Laysan, 173 to 182 fathoms; 3966, vicinity of Laysan, 116 to 168 fathoms.

Family CHAMPSODONTIDÆ.

Champsodon fimbriatus, new species. Plate 88.

Type, a female 80 mm. long, from station 4101, Pailolo Channel, depth 122 to 143 fathoms; type, No. 51629, U. S. Nat. Mus.

Differing from *Champsodon vorax* Günther (Shore Fishes, Challenger, 43, 52, pl. 23, fig. A) in the much deeper body and the shorter spinous dorsal.

Head 29 hundredths of total length, without caudal; depth 23 (19 in *vorax*); least depth of caudal peduncle 5.5; length of maxillary 19; snout 9; eye 5.5; interorbital width 3.5; distance from tip of snout to origin of dorsal 37; distance between origins of first and second dorsals 12. (In *C. vorax*, distance from tip of snout to origin of spinous dorsal 31 hundredths of length; distance between origins of dorsals 16). D. IV–19; A. 17; P. 14; V. I, 5.

Top of head flat between the ridges, which are roughened and entirely similar to those in *vorax*. Mandible projecting much at tip, but laterally included; premaxillaries with a double notch anteriorly to receive mandibular tip; a short filament on upper part of eye-ball, and a smaller broader process behind it, this process lacking in *vorax;* process on anterior margin of preorbital bearing 2 more or less diverging sharp spines, not 3 as in *vorax*. Spine at angle of preopercle similar, long, compressed at base and curved; two shorter spines directed downward and forward on horizontal limb, and some irregular serrulations on vertical limb of preopercle; opercle without spine, very thin and flexible, striate, with a wide membranous margin which is much more coarsely fringed than in *vorax;* teeth similar, but more slender and less curved; but 2 or 3 small teeth directed backward on each side of head of vomer, these working directly against 2 small patches of similar teeth on the basibranchials of the fourth arch; no tongue present; a wide slit behind the fourth gill-arch; pseudobranchiæ present; gill-rakers 2 + 12 on first arch; gill-membranes not united; anterior end of gill-slits vertically below nostrils; branchiostegals 7.

First dorsal shorter than in *C. vorax* and more posteriorly inserted; also less widely separated from soft dorsal; spines usually 4 in number (4 in 10 specimens, 5 in 5 specimens counted), while in *vorax* they are usually 5, rarely 6. Pectorals very slender and short, with very fine rays, their length equaling that of snout and half eye; ventrals with the fourth ray longest, reaching anus; caudal widely forked; all the dorsal rays save the first are once forked near the tip, the branches not divergent, the last ray cleft to base; anal rays similar to those of dorsal.

Scales a little coarser than in *vorax;* each scale subcircular, attached centrally, elevated above the general surface, the margins free; posterior margin of each side with from 3 to 6 strong spines, of which the central ones are the longest; scales closely adherent, and completely investing head and body; the breast and belly, the opercles, except only the thin membranous margin, the cheeks, snout and top of head, the maxillary, premaxillary and mandible and the gular membrane, all closely covered; two lateral lines present on side, a line on each side of occiput running backward along base of spinous dorsal, numerous lines on head, and many cross lines above the upper lateral line and below the lower. Sensory organs are lodged in small freely-projecting papillæ, which project among the scales.

Color dusky brownish on back with 3 faint broad dark cross-bars; sides and below silvery, the sides speckled with brownish; fins all whitish, unmarked.

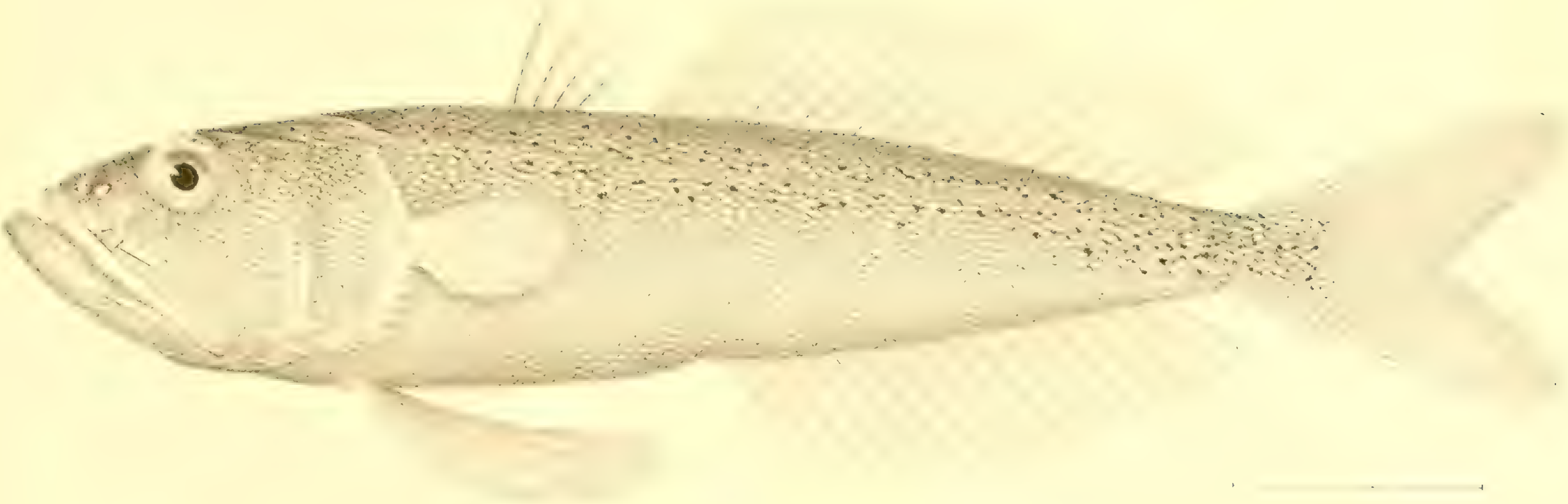
Many specimens were obtained at station 4101, but the species was not obtained elsewhere. In 15 specimens examined, the dorsal and anal fin counts are as follows: Dorsal IV–18, anal 16, 1 specimen; IV–18, anal 17, 1 specimen; IV–19, anal 17, 3 specimens; IV–19, anal 18, 1 specimen; IV–20, anal 17, 2 specimens; IV–20, anal 18, 2 specimens; V–19, anal 16, 1 specimen; V–19, anal 17, 1 specimen; V–20, anal 18, 3 specimens.

Family CALLIONYMIDÆ.

Callionymus cæruleonotatus, new species. Plate 89.

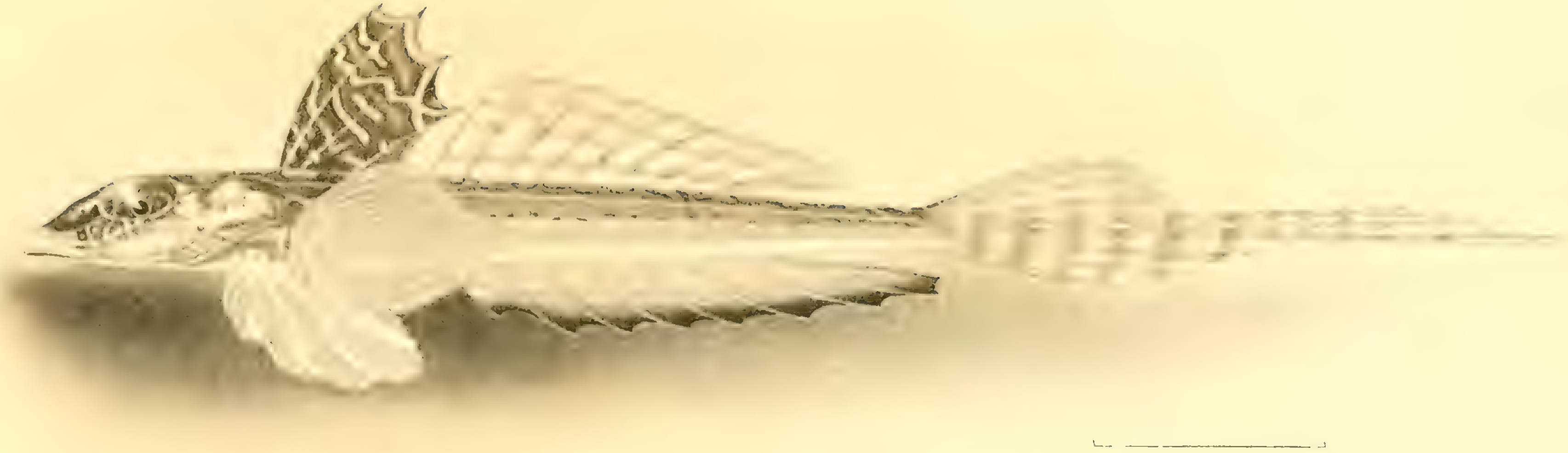
Type, 86 mm. long, 49 mm. to base of caudal, from station 4066, off east coast of Maui, depth 49 to 176 fathoms; type, No. 51603, U. S. Nat. Mus.

Length of head (measured to opercular margin) 31 hundredths of total length without caudal; depth 12; width at base of pectorals 17; length of snout 9; diameter of eye 9; length of maxillary 10; distance between branchial pores 9; distance from tip of snout to first dorsal spine 28; length of first



CHAMPSODON FIMBRIATUS GILBERT. TYPE.

JULIUS BIEN & CO. LITH. N.Y.



CALLIONYMUS CÆRULEONOTATUS GILBERT TYPE

dorsal spine 25; distance between dorsals 8; length of caudal 75; longest ventral ray 23; longest pectoral ray 24. D. IV-9; A. 8; P. 17.

Very slender, with slender preopercular spine bearing 4 or 5 hooked spines on upper surface, in addition to the terminal spine; interorbital space very narrow, but grooved; none of the dorsal spines produced, the second the longest, the third and fourth rapidly shortened; head comparatively narrow, its width half its length; snout short, maxillary reaching vertical from front of eye; teeth villiform, in moderate bands, in jaws only; 2 or 3 enlarged teeth directed backward and forward in the inner series, in the middle of each mandibular ramus; occipital region flattened, very slightly roughened; preopercular spine slender, straight, its tip hooked up to form a spine, its upper margin furnished with 4 or 5 other spines, retrorsely hooked and evenly distributed along its whole length, not grouped at its distal end as usual in this genus; lower margin of spine with 2 or 3 minute teeth, irregular in size and position; the usual strong hooked spine present at base on outer face; preopercular spine reaching half the distance from its base to opercular margin, its length half diameter of eye.

None of the dorsal spines produced or filamentous; upper outline of fin rounded; first spine equal to second or slightly shorter, the third and fourth rapidly shortened; tips of first, second, and third spines in the declined fin reaching the same vertical, which is that of the third ray of second dorsal; soft dorsal comparatively low, the last ray falling far short of base of caudal; anal similar to second dorsal, but higher, its ray slightly passing caudal base, its length slightly greater than that of soft dorsal and its insertion a little more posterior; the 3 middle caudal rays are produced to form a filamentous process, the total length of caudal equaling length of trunk (without head); the membrane of inner ventral ray joining pectoral at the middle of its base; pectoral extending beyond tips of ventrals, both fins passing front of second dorsal; lateral line single, as usual, and with a characteristic beaded appearance; it runs out on caudal fin, accompanying the fifth ray of the upper lobe for a distance equaling two-thirds diameter of eye.

Color in spirits, dusky olive on top of head and dorsal half of body, finely vermiculated with narrow dusky lines inclosing very small spots of the ground color; lower half of sides of head and body, including branchiostegal membrane, the upper surface of ventral fins with the membranes connecting them to base of pectoral, and the lower half of caudal fin golden-yellow, marked with bright blue spots and lines, each blue mark with a wide dusky margin; on lower side of head and trunk the blue spots frequently coalesce to form lengthwise lines; belly and lower parts generally plain dusky; a quadrate black blotch under spinous dorsal, a narrow dark bar under last dorsal rays, sometimes one also under first dorsal rays, and one on back of tail, these dark bars all faintly marked; a blackish streak from eye around tip of snout; spinous dorsal dusky golden, crossed by zigzag blue lines, each narrowly edged with blackish; soft dorsal translucent dusky golden, with irregular blue lines and blotches, arranged for the most part longitudinally. Anal similar to second dorsal, the blue lines more oblique, the marginal third of fin black; darker markings on caudal arranged in the form of cross-bars.

The above description is drawn from a male specimen. In females the middle caudal rays are not produced, and no trace of the blue and golden coloration can be detected. The anal is translucent, with a narrow black edge, the median caudal rays are faintly barred, and the spinous dorsal is black with narrow oblique lighter lines.

The pectoral rays vary in number from 16 to 18; one specimen has but 8 dorsal rays; otherwise the dorsal and anal fin rays present no variation.

The species was taken at the following stations: Nos. 3857, Pailolo Channel, between Molokai and Maui, 127 to 128 fathoms; 3858, Pailolo Channel, between Molokai and Maui, 128 to 138 fathoms; 4066, off the eastern coast of Maui, 49 to 176 fathoms.

Callionymus corallinus, new species. Fig. 251.

Type, 40 mm. long, from station 3873, Avau Channel between Maui and Lanai islands, depth 32 to 37 fathoms; type, No. 51581, U. S. Nat. Mus.

Length of head, from tip of snout to opercular margin in front of pectorals, 40 hundredths of total length without caudal; from tip of snout to gill-opening 33; diameter of orbit 9; length of snout 12; length of maxillary 11; greatest width of head 27; greatest depth 18; length of preopercular spine 12; distance from tip of snout to front of anal 55; length of anal base 27; length of longest dorsal spine 23; longest dorsal ray 17; longest anal ray 16; longest ventral ray 30; length of pectoral 25; length of caudal

29. D. iv–9, none of the spines produced, the last ray cleft to base; A. 8, the last ray cleft to base; V. i, 5, the rays profusely branched, the membrane joining the pectoral fin a little above its middle; P. 18.

Form depressed anteriorly, wider than deep; occiput nearly flat; a slight prominence on each side median line, minutely rugose; bony interorbital space very narrow, less than half diameter of pupil, and not grooved; snout very narrow and sharp, longer than diameter of orbit; mouth horizontal, maxillary not reaching vertical from front of orbit; preopercular spine robust, straight, its tip reaching slightly beyond opercular margin, its inner edge with 6 or 7 strong slender curved spinelets, evenly and closely spaced, decreasing in length toward base of spine, the terminal one shorter than the one before it, but curved in the same direction; outer edge of spine smooth, but bearing a short retrorse spine near its base; gill-opening a minute pore superiorly placed.

None of the dorsal spines produced or filamentous in the type, a female; first spine longest, reaching, when declined, to base of second soft dorsal ray; second dorsal and anal fins beginning at the same vertical; caudal rounded; pectorals reaching well beyond ventrals, the latter slightly passing vent.

Ground color greenish olive above, silvery white on abdomen and throat; upper parts of head and body profusely marked with reddish gilt in stripes and patches which almost wholly conceal the ground color; in addition there are many minute round spots of coral-red, covering upper part of snout, interorbital space with upper part of eyeballs, upper half of opercles, and the preopercular spine; a line of them bounds the occiput, and a few occupy the upper part of cheek; they form an inconspicuous cross-bar below spinous dorsal and 2 below soft dorsal; they occupy also the membrane between first and second dorsal spines, and a few are found on the distal half of ventrals and the median caudal rays; pectorals largely translucent; ventrals with a broad black bar at base and one at tip; membranes of spinous dorsal largely dusky, soft dorsal translucent, with 6 oblique olive-brown bars on tips of last rays, the last one blackish; anal translucent, the last rays tipped with black; caudal with 3 broad olive-brown bars, as wide as the translucent interspaces; iris silvery, tinged with red.

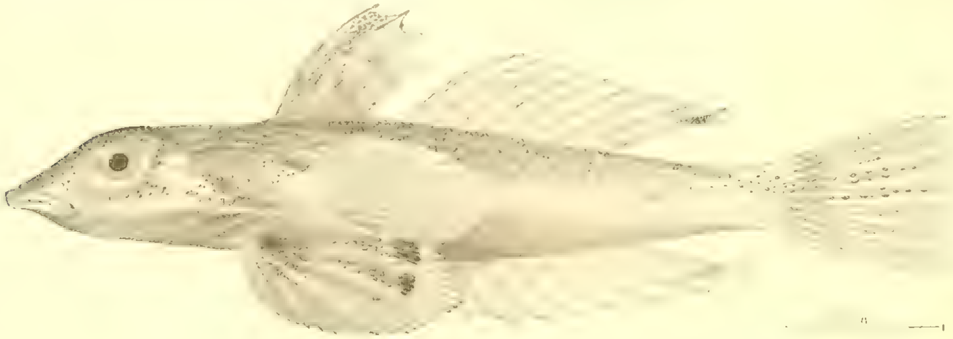


Fig. 251.—*Callionymus corallinus* Gilbert, new species. Type.

Only the type known.

Callionymus rubrovinctus, new species. Fig. 252.

Type, 24 mm. long, from station 3876, channel between Maui and Lanai islands, depth 28 to 43 fathoms; type, No. 51580, U. S. Nat. Mus.

Head (measured to opercular edge) 34 hundredths of total length without caudal; greatest width 23; depth 16; eye 12, much longer than snout. D. iv–8; A. 8; P. 17.

Comparatively very short and heavy; snout very short, not more than two-thirds diameter of eye; mouth much more oblique than usual in the genus, maxillary reaching a little past front of eye; interorbital space very narrow, minutely grooved; occiput broad, transversely rounded, minutely roughened by anastomosing lines and points; preopercular spine very long and robust, projecting beyond opercular margin, its tip curved upward to form a slender hook, immediately anterior to which on the upper margin are two stronger hooked spines, the posterior directed upward, the anterior upward and forward; lower edge of preopercular spine smooth; the antrorse denticle at base on outer face of preopercular spine, usually present in species of *Callionymus*, is here wanting; branchial pore occupying its usual position, immediately below origin of lateral line.

First dorsal spine much produced and filamentous, extending to or slightly beyond base of last dorsal ray; second spine short, not reaching origin of soft dorsal when depressed; third and fourth spines rapidly and equally shortened; neither soft dorsal nor anal elevated; last anal ray reaching when declined to or nearly to caudal base; soft dorsal inserted more anteriorly, so that its last ray fails to reach caudal; caudal fin pointed, but with none of its rays produced or filamentous; membrane of inner ventral ray joining base of pectoral at end of its upper fourth; ventrals reaching vent; pectorals to base of second anal ray.

Color in life, back with 4 bright red bars extending nearly to middle of sides, the first bar broad, occupying nape and base of spinous dorsal; the second broader, underlying anterior half of soft dorsal; the third less than half the width of the second, located under last dorsal rays; the fourth, on caudal peduncle, again wider; lower half of sides marked with 4 irregular brownish black blotches, each forming a downward continuation of one of the red bands, the anterior blotch very small, the second the largest, the spaces between these dark blotches pearly white; a dark blotch in the middle of the lower caudal rays, a smaller one near tips of rays, 2 very narrow blue bands near middle of fin; anal black throughout; a small black spot in axil of ventral fins; dorsals whitish, unmarked; upper surface of head, including upper half of eye but not snout, reddish; lower parts whitish.

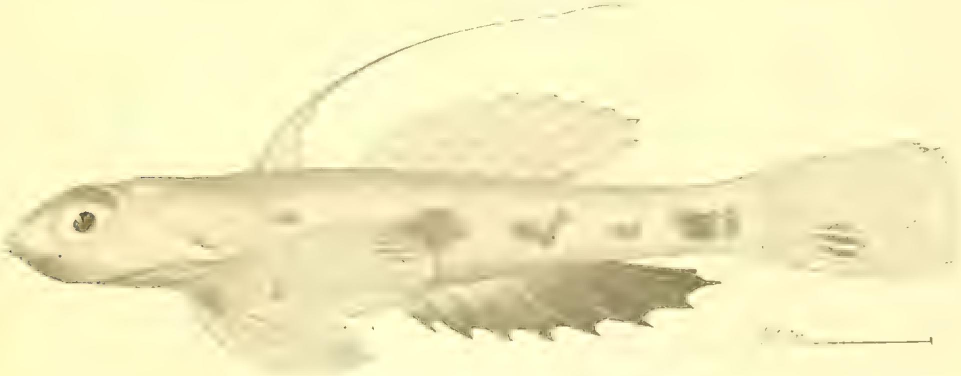


FIG. 252.—*Callionymus rubrovinctus* Gilbert, new species. Type.

Two specimens here designated as cotypes, of about equal size with the type, were taken at station 3847, off the south coast of Molokai, at a depth of 23 fathoms. These have the following fin-formulas: Dorsal IV–8, anal 7; dorsal IV–9, anal 8.

The species was taken at stations Nos. 3847, off the south coast of Molokai, 23 fathoms, and 3876, channel between Maui and Lanai, 28 to 43 fathoms.

Calliurichthys decoratus, new species. Plate 90.

Type, ♂, 183 mm. long (91 mm. long to base of caudal), from station 4032, Penguin Bank, off the southern coast of Oahu, 27 fathoms; type No. 51609, U. S. Nat. Mus.

Closely related to *C. japonicus* (Houttuyn), but distinguished from that and all other known species by the fin-formula, the presence (in the male) of a single filamentous dorsal spine, and the remarkably beautiful decoration of the throat and branchiostegal membranes. The caudal is exceedingly elongate, as in *C. japonicus.*

Length of head (measured to opercular margin) 30 hundredths of total length without caudal; depth 11; width at base of pectorals 20; length of snout 10; diameter of eye 7.5; length of maxillary 8; distance between branchial pores 10; distance from tip of snout to first dorsal spine 26; length of first dorsal spine 50; length of second dorsal spine 13; distance between dorsals 7; length of caudal 104; longest ventral ray 28; longest pectoral ray 22. D. VI–9; A. 8; P. 20.

Snout short, declivous, as in *C. japonicus;* maxillary barely reaching vertical from front of orbit; teeth in narrow villiform bands in jaws only; eyes large, 3⅓ in head measured to branchial pore, separated only by a sharp bony interorbital ridge which has no trace of a lengthwise groove; occipital region slightly swollen on each side median line, the surface finely rugose; preopercular spine long, very slender, and straight, ending in a long tapering point directed backward; upper edge of spine furnished with 8 small saw-like teeth, directed toward base of spine, the anterior teeth smallest; lower edge of spine smooth; a strong hooked spine at base, on outer surface; preopercular spine extending to opercular edge, and equal in length to diameter of eye.

In males, the first dorsal spine is very long and filamentous, reaching to or beyond middle of soft dorsal. In the type, it extends to base of the seventh dorsal ray; other spines are regularly shortened; tip of last dorsal ray reaching slightly beyond base of upper caudal rays; anal fin beginning and ending slightly behind first and last dorsal rays; tip of last anal ray in the same vertical with tip of last dorsal ray; membrane of inner ventral ray joining anterior face of pectoral base at beginning of its upper fourth; longest pectoral ray reaching slightly beyond vertical of the second anal ray, the inner ventral ray falling a little short of this vertical; median caudal rays extraordinarily produced in adult males, a little exceeding length of head and trunk; the single lateral line runs out on caudal fin for a distance equaling twice diameter of eye, accompanying the fourth fully developed ray of upper caudal lobe.

Color in spirits, brownish, grayish brown, or grayish pink on dorsal region, white below; back with 4 or 5 rather indistinct darker cross-bars, and 5 small dark spots on middle of sides; a faint dark streak below eye, and one downward from base of preopercular spines; upper half of body marked also with numerous round gray spots of varying size, each spot surrounded by a blackish line; dorsal black at base and tip, the filamentous ray whitish; soft dorsal and caudal cross-banded; anal fin black, with broad white tips to the rays in adult males; upper face of ventrals dusky, paired fins otherwise unmarked; under surface of head most characteristically ornamented in adult males; a broad jet-black bar occupying median line of throat, broadening slightly on front of breast, where it terminates; from this bar there diverge on either side about 8 narrow jet-black streaks, which pursue a nearly parallel curved course over gill-membranes and over membrane joining inner ventral ray to pectoral base; each black streak is divided lengthwise by a narrow silvery line and margined above and below by wider silvery lines, the interspaces otherwise grayish silvery. Females and young males have throat unmarked, the first dorsal spine not produced, and the caudal shorter. Pectoral rays usually 20 in number but varying from 19 to 21. Dorsal and anal rays invariably as given for the type.

Specimens were taken at the following stations: Nos. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3861, Pailolo Channel, 30 to 52 fathoms; 4032, Penguin Bank, south of Oahu, 27 to 29 fathoms.

A fine female specimen of this species has been subsequently presented by Mr. Max Schlemmer, who secured it at Laysan Island.

Family HARPAGIFERIDÆ.

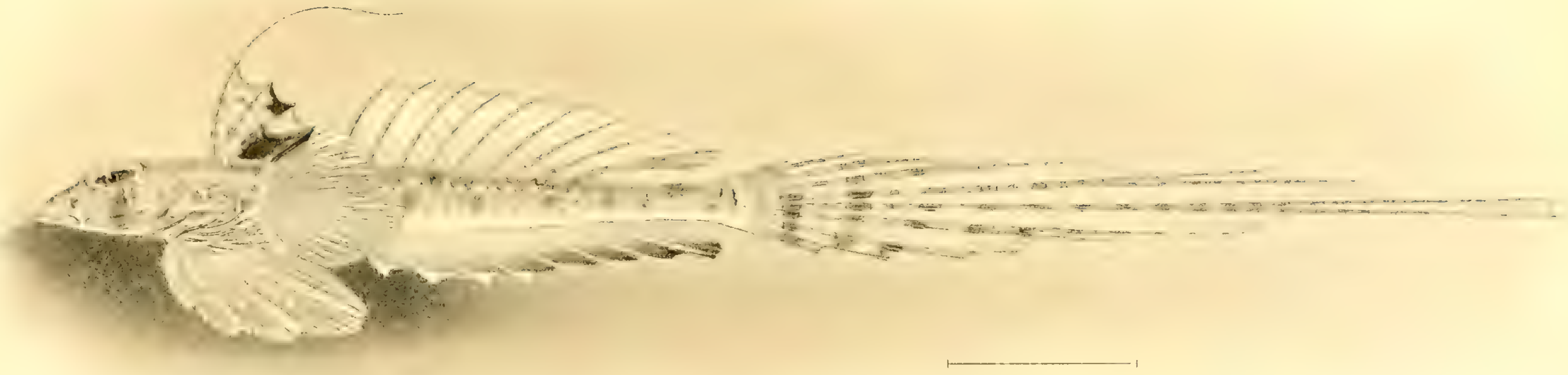
Draconetta hawaiiensis, new species. Plate 91.

Type, 53 mm. long, from station 4102, channel between Molokai and Maui, depth 122 to 132 fathoms; type, No. 51633, U. S. Nat. Mus.

Very near *Draconetta xenica* Jordan and Fowler, from Japan (Proc. U. S. Nat. Mus., XXV, 1903, 939), differing in the smaller eye, the straight opercular spine, the longer stronger subopercular spine, the longer dorsal spines, and the longer ventral fins. In fin-formulæ, general proportions and color, there is close correspondence between the 2 species.

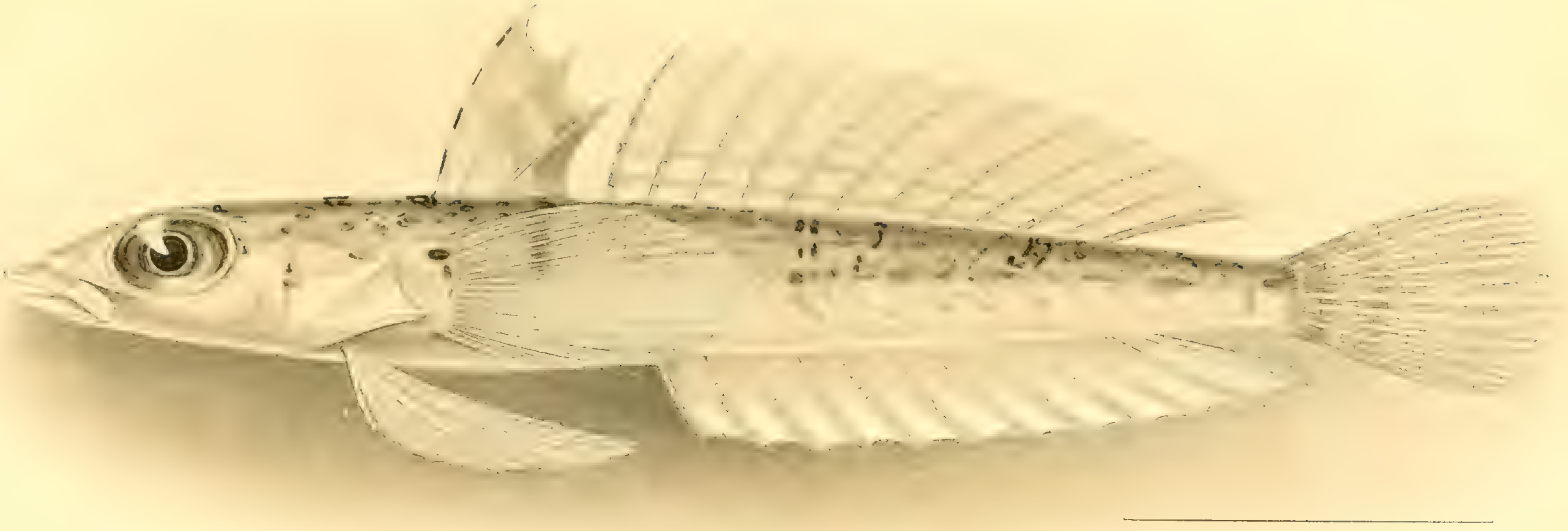
Head (measured to end of subopercular spine) 33 hundredths of total length, without caudal; depth of body 14; eye 11; maxillary 9. D. III, 12; A. 12; P. 21.

Snout short and sharp, triangular, premaxillaries projecting on middle line for more than ⅔ length of snout; premaxillaries very protractile, their spines reaching almost to middle of interorbital space; cleft of mouth horizontal, narrow, at lower side of snout, the mandible everywhere included; maxillary reaching a vertical midway between front of orbit and front of pupil; teeth all villiform, in moderate bands in the jaws only; interorbital space very narrow, about ⅓ the pupil, with a shallow groove in its anterior half only; opercle greatly reduced in size, forming a strong spine directed upward and backward; it is either straight or very little curved near its tip, and is directed toward base of upper pectoral rays. In *D. xenica*, it is shorter and more arched, directed toward a point in advance of first dorsal spine. Subopercle also developed as a long strong spine; opercular and subopercular spines diverging, the interspace filled by a soft membrane, which forms the middle portion of gill-flap; subopercular spine



CALLIURICHTHYS DECORATUS GILBERT. TYPE.

JULIUS BIEN & CO. LITH. N.Y.



DRACONETTA HAWAIIENSIS GILBERT TYPE

much longer than in *D. xenica*, reaching to within half a millimeter of base of pectoral. In the type specimen of *xenica*, 65 mm. long, a space of 2 mm. intervenes between the subopercular spine and the base of the pectoral. Gill-slit entirely lateral, little wider than the distance between the tips of the 2 spines; lower end of gill-slit immediately above base of ventral spine; preopercular margin adnate, not armed; occiput slightly roughened, less so than in *xenica*.

Ventrals with their inner margin wholly free, not joined by membrane to base of pectorals, as in *Callionymus;* ventrals also less widely separated at base. In *D. hawaiiensis*, they are much longer than in *xenica*, reaching base of second anal ray; pectorals reaching well beyond ventrals.

First dorsal spine longest, the second and third of about equal length, the upper margin of fin concave; when the fin is declined, the tips of all the spines extend beyond base of first dorsal ray; soft dorsal and anal similar, low, of equal length; anal a little more posteriorly inserted; the last dorsal and anal rays fall short of base of caudal, when depressed; caudal fin short, rounded; no trace of lateral line.

Color in spirits very light gray above and below, the back with faint traces of 5 darker cross-bars; first and second cross-bars under origin and end of spinous dorsal, the third and fourth equally spaced under soft dorsal, the fifth on back of tail; dorsal region faintly spotted and mottled with darker; 5 faint ocellated round spots form a V-shaped figure with its apex on nape, the diverging arms inclosing front of spinous dorsal; posterior part of spinous dorsal black; two narrower horizontal black lines on soft dorsal, caudal with 2 faint dark bars on basal portion; two small black spots at base of pectoral; fins otherwise unmarked.

Only the type specimen was obtained.

Family ATELEOPIDÆ.

Ateleopus plicatellus, new species. Fig. 253.

Type, 55 cm. long, from station 3868, Pailolo Channel, 294 to 684 fathoms; type, No. 51586, U. S. Nat. Mus.

Head 15 hundredths of total length; greatest depth (at occiput) 9; length of head and trunk 31; predorsal length 17.5; preventral length 10; length of pectoral 14; longest dorsal ray 13.5; length of ventral 6. Length of snout 36 hundredths of head; preoral length of snout, measured axially, 15; interorbital width 35; diameter of eye 14; length of maxillary (measured from front of premaxillaries) 35; width between angles of mouth 26. D. 9; P. 14; V. 3; A. and C. 104.

Snout very blunt, overpassing mouth for about two-fifths its length; mouth wide, horizontal; maxillary reaching a vertical from middle of orbit, a trifle shorter than length of snout; anterior half of each premaxillary containing a very narrow band of small teeth, the posterior half, and the entire mandible, toothless. Also in *A. japonicus* Schlegel, the mandible is toothless, although described and figured with a band of teeth. Vomer and palatines toothless; premaxillaries very protractile, but the maxillary firmly adnate, skin of head passing over it without interruption; upper and lower lips finely plicate as in *Catostomoids*. Posterior nostril an oblique slit immediately in front of upper part of orbit, the anterior in a short procumbent tube with the opening directed forward; a strong protuberance above eye, a smaller one behind and above it; a pair of strong ridges running from occiput forward between eyes to snout, the space between them concave; angle of lower jaw provided with a spinous process; preopercular margin not free; opercle with a single low ridge and no spines; sensory canals of head furnished with very few minute pores; gill-openings wide, continued forward to below pupil, the membranes wholly separate, free from isthmus; 4 complete gills, the fourth arch with a slit behind it; gill-rakers short and thick, minutely toothed and a little movable, 10 in number on anterior arch; vertical limbs of all the arches adnate, or free for a very short distance next the angle, the horizontal limbs also attached anteriorly, somewhat narrowing the slits; pseudobranchiæ wanting; branchiostegals 7; skin very delicate, easily broken, scaleless; lateral line present, but inconspicuous, composed of a few large distant pores.

The anterior insertion of the dorsal fin is above the axil of the pectorals, the length of its base half postocular length of head, its tip reaching vertical from vent; pectorals failing to reach vent by a distance nearly equaling one-third their length; the ventral appears to be a simple filament, but on dissection 2 slender rays appear closely joined for their entire length, with a short rudiment at their base; they taper uniformly to their tips, which are not dilated and flattened as in *japonicus*. In the type their length equals that of snout, and they extend one-fourth the distance between their base and the origin of anal fin; in the smaller cotypes they are a little longer, but they never reach middle of pectoral fins; in *A. japonicus*, the ventrals are much more slender and elongate, extending more than three-fourths distance to vent, and dilated and flattened at their tips.

Color dusky translucent, lips and terminal half of ventral filaments white; other fins jet-black; mouth and gill-cavities and peritoneum pale.

Contents of stomach consisting largely of very small sea-urchins, occasionally with serpent-stars and hermit crabs. The stomach is very wide, without flexure, passing directly into the capacious intestine. No pyloric cæca are developed. The liver is very small.

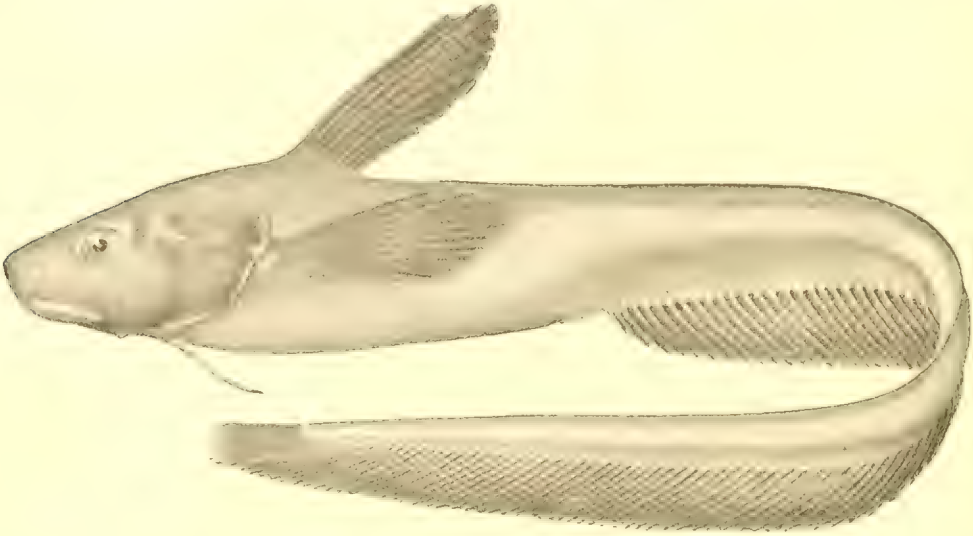


FIG. 253.—*Ateleopus plicatellus* Gilbert, new species. Type.

A. plicatellus agrees with *A. indicus* Alcock in the short tapering ventrals, but differs in the larger eye, the heavier, less projecting snout, the larger mouth, and the lighter color.

In the cotypes of *A. plicatellus*, which equal in size the type of *A. indicus*, the snout is broadly rounded and overpasses the mouth for a distance less than two-fifths its preocular length, the diameter of eye equals four-sevenths the length of snout, and the cleft of mouth reaches vertical from front of pupil; vertical fins and pectorals jet-black, color otherwise uniformly grayish, without trace of dark brown or purple-black.

The species was taken at stations Nos. 3868, Pailolo Channel, 294 to 684 fathoms; and 3918, off the South coast of Oahu, 257 to 294 fathoms.

Family LYCODAPIDÆ.

Snyderidia, new genus.

Body compressed; mouth oblique; premaxillaries protractile; mandible included; enlarged fang-like teeth present in jaws and on vomer and palatines; no barbel; preopercular margin not adnate; head without spines; gill-openings continued forward to below eye; gill-membranes separate, free from isthmus; branchiostegals 7; pseudobranchiæ present, much reduced; gill-rakers present; 4 gills, a wide slit behind fourth arch; skin thin, not lax, scaleless; no lateral line; dorsal and anal beginning near head, continuous around end of the whip-like tail; no ventrals; pectorals narrow; stomach thick-walled; pyloric cæca 2, short and thick, on opposite sides of the pylorus.

Snyderidia Gilbert, new genus of *Lycodapidæ* (*canina*).

Snyderidia canina, new species. Plate 92.

Type, 309 mm. long, from station 3989, vicinity of Kauai, depth 385 to 500 fathoms; type, No. 51646, U. S. Nat. Mus.

Head 8.5 in total length; depth 10; distance from tip of snout to origin of anal 5.8; from tip of snout to origin of dorsal 7.5; diameter of eye contained 5.25 times in head, 1.2 times in interorbital width, the latter equaling length of snout.

Middle of occiput and interorbital space raised to form a rounded crest; snout protruding convexly, upper profile concave above front of eye; mouth very oblique; maxillary extending well beyond orbit, equaling half length of head, its expanded portion channeled on its outer face; mandible strong and heavy, included within premaxillaries; mandibular angle forming a sharply projecting triangular process; upper jaw bearing anteriorly a pair of long curved canines which close outside mandible, and are separated by a wide space which is toothless, or nearly so; one of the canines double; sides of premaxillary with arrow-shaped cardiform teeth in a rather wide band, a few of the anterior inner teeth of the band longer than the others and more distinctly depressible; anteriorly in the mandible a pair of long curved canines corresponding to those above, but separated by a narrow interspace and directed obliquely backward; in side of mandible an outer series of smaller teeth and an inner row of conical canines, shorter than the anterior fangs; a long fang on head of vomer, with 2 pairs of shorter conical teeth behind it, and several very small conical teeth irregularly disposed; a single series of small conical teeth on the palatines, 1 or 2 of the anterior teeth much enlarged; preopercular margin adnate in its upper half, free below; opercle bearing 2 diverging ridges and terminating posteriorly in a slender flexible process which is bound down by membrane along its upper edge; lower opercular ridge extending into a second process which overlaps the subopercle; pseudobranchiæ present as a pair only of well-developed filaments on each side; but 3 short gill-rakers developed on horizontal limb of outer arch next the angle; besides these, a number of small spinigerous tubercles, which can not be accurately estimated; a few inconspicuous pores on snout and on symphyseal portion of mandible; posterior line of occiput midway between origin of dorsal and middle of eye.

Dorsal rays all very slender and unbranched, with but few distant articulations, and joined by a very thin delicate membrane; anal similar, with thicker rays; pectoral narrow, composed of very slender unbranched rays, its length equaling that of head.

Ground color light grayish, almost wholly concealed by small quadrate or roundish pigment spots of nearly uniform size and distribution; terminal part of tail black; opercles and jaws darker, as well as prepectoral area; mouth and gill-cavity blackish, lining of abdominal walls jet-black; fins nslucent.

A single specimen known.

Family FIERASFERIDÆ.

Fierasfer microdon, new species. Fig. 254.

Type, 97 mm. long, from station 3872, between Maui and Lanai islands, depth 32 to 43 fathoms; type, No. 51600, U. S. Nat. Mus.

Head 14 hundredths of total length; greatest depth 10; distance from tip of snout to front of dorsal 25; distance from tip of snout to front of anal 14. Length of maxillary 45 hundredths of head; diameter of eye 23; length of snout 20; interorbital width 13; depth of head at nape 60; greatest width of head 50; length of pectoral 50.

Head and body narrow, compressed, snout bluntly rounded, its profile nearly vertical immediately above mouth; mouth very oblique; maxillary failing to reach vertical from hinder edge of orbit; branchiostegal membranes united anteriorly, leaving about half the isthmus uncovered; teeth all comparatively small, the median line of vomerine teeth being the only conspicuous canines in the mouth, and these much smaller than in *F. homei;* a few smaller teeth on each side of median vomerine series; palatine and premaxillary teeth minute, in bands of moderate width, none of them enlarged except 2 or 3 near front of upper jaw (on one side only in type), these being small conical teeth, not canines; neither palatine nor premaxillary bands show any trace of biserial arrangement, or of enlargement of outer or inner series; outer series of mandibular teeth very small slender canines, hooked toward angle of mouth; inner teeth minute and forming a narrow band.

Pectoral fin with 16 rays; dorsal low but distinct, its origin well behind tip of pectoral.

Color whitish translucent with slight luster; end of tail rendered slightly dusky by scattered pigment spots; occiput dusky, snout and tip of mandible slightly so.

From *F. homei* (Richardson), this species differs in its small and more oblique mouth, smaller teeth, and less slender tail; from *F. brandesii* (Bleeker), in smaller teeth and longer pectoral.

Only the type is known.

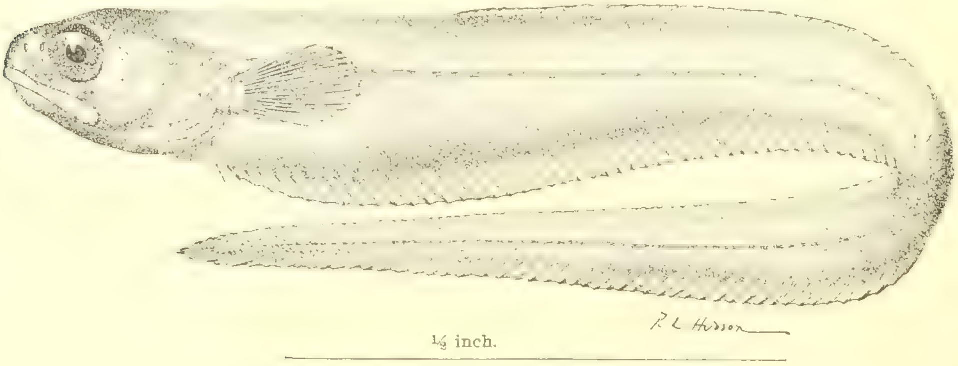


FIG. 254.—*Fierasfer microdon* Gilbert, new species. Type.

Jordanicus new genus (Fierasferidæ).

Jordanicus Gilbert, new genus of *Fierasferidæ* (*Fierasfer umbratilis* Jordan & Evermann).

Differing from *Fierasfer* in the depressed head, which is as broad as it is high, and especially in the adnate maxillaries and the lack of a distinct lower lip; the skin of snout and suborbital region passes without fold or other interruption over the maxillary and premaxillary, both of which are thus concealed and firmly bound down; mandible broad and flat; fleshy margin of jaw wide, flattened to an edge, extending well beyond dentary portion of jaw, but not separated by a fold from the integument covering the mandible; the mandibular teeth are opposed to the palatine band, and the expanded fleshy margin of mandible shuts within the premaxillary series both anteriorly and laterally; no pronounced fold of integument along inner margin of the mandible; branchiostegals 7.

Jordanicus umbratilis (Jordan & Evermann).

A single specimen, 146 mm. long, was taken in Puako Bay, Hawaii. It is exclusively a shore species, introduced here for purposes of comparison with *Fierasfer*.

The angle formed by the gill-membranes on median line below is behind eye a distance equaling half diameter of latter; premaxillary teeth minute, confined to anterior half of jaw, apparently in a single series; mandibular and palatine teeth also in single series, those on sides of mandible directed laterally toward angle of mouth, none of them enlarged; 2 or 3 vomerine teeth are the largest in the mouth, and are arranged in a longitudinal series.

Fierasfer parvipinnis Kaup, resembles this species in the depressed head and tumid cheeks, but according to Kaup's figure, it is a true *Fierasfer*.

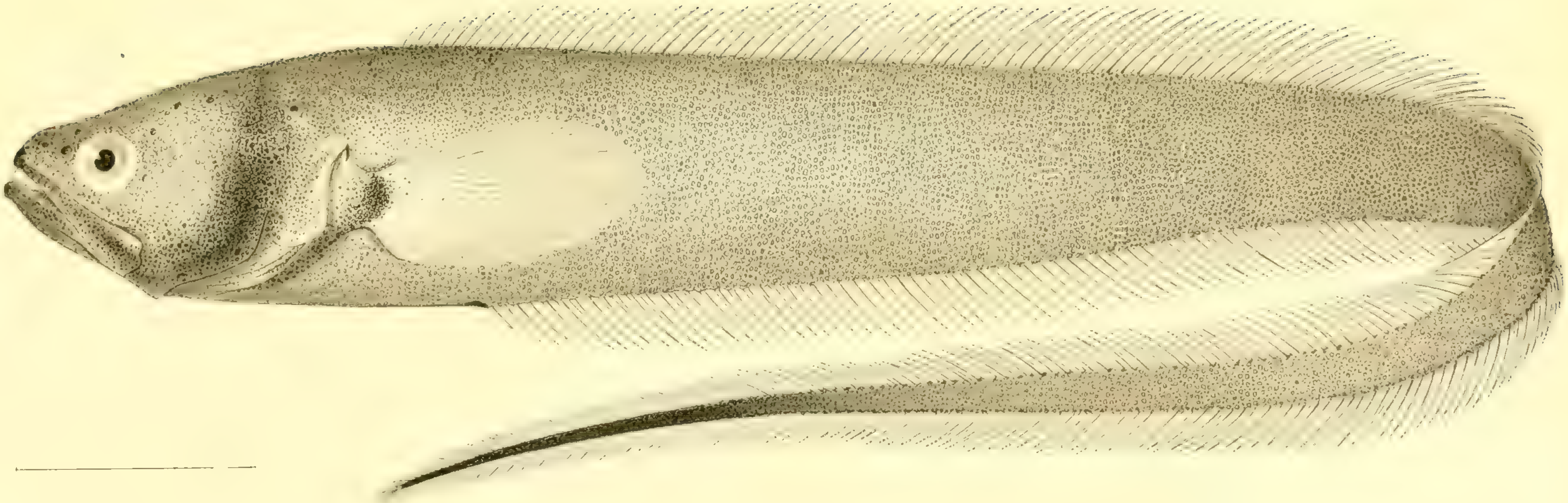
Fierasfer umbratilis Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902, 206.

Family GADIDÆ.

Antimora microlepis Bean.

One specimen, 465 mm. in total length, was taken at station 4185, in the vicinity of Kauai, at a depth of 1,000 to 1,314 fathoms.

The number of fin-rays is slightly below the normal for *microlepis*. Abundant material might show that the Hawaiian representative is specifically separable, but direct comparison with typical *microlepis* from Alaskan waters has developed no further differences.



SNYDERIDIA CANINA GILBERT. TYPE.

Head 26.5 hundredths of length to base of caudal; depth 21; depth of caudal peduncle 3; length of filamentous dorsal ray 23; filamentous ventral ray 24; outer ventral ray 12; pectoral 20; distance between ventrals and anal 40; length of anal base 20. Longitudinal diameter of orbit 25 hundredths of length of head; interorbital width 26; length of snout 30; distance from tip of snout to front of premaxillaries 11; length of maxillary 47, its tip noticeably behind posterior margin of orbit; length of mandibular barbel 9. D. rays 4 + 51; A. 38; P. 18 or 19; V. 6. About 130 transverse rows of scales on sides, the number uncertain owing to the irregularity of the series.

Teeth in narrow bands on jaws, and in a small cluster on head of vomer; gill-rakers very short, 3 + 11.

Body entirely denuded of scales and with light gray appearance, the membranes of scale-pouches blackish; gill-membranes and pectorals, ventrals, and caudal deep blue; lining of the gill-cavity and abdominal wall black.

In 8 specimens of *A. microlepis* from Alaska, the dorsal formula is as follows: 4–50, 4–53, 4–54, 4–54, 4–54, 4–54, 4–54, 4–55. In 6 specimens the anal rays are 40, 40, 41, 42, 43, 44.

Antimora rhina Garman, from the Panama region, is said to differ from *microlepis* in the longer dorsal fin (4 or 5–54 to 56) and the smaller scales (145). As is seen from the dorsal formula of *microlepis* given above, the latter does not differ from *rhina* in the size of the dorsal fin. It seems probable that the 2 species are identical, especially as a careful comparison of Garman's description with typical *microlepis* fails to develop any differences.

Læmonema rhodochir, new species. Fig. 255.

Type, 116 mm. long, from station 3810, off the south coast of Oahu, depth 53 to 211 fathoms; type, No. 51623, U. S. Nat. Mus.

Length of head 25 hundredths of total length without caudal; length of snout 7.5; interorbital width 3.5; longest diameter of orbit 7; length of maxillary 12; length of barbel 6; depth of body 19; least depth of caudal peduncle 2.5; length of ventrals 27; length of pectorals 18; first dorsal ray 12. D. 5–64; A. 59; P. 24; V. 2. Scales in about 130 cross-series above lateral line, 10 or 12 scales between lateral line and base of anterior dorsal rays.

Snout depressed, evenly rounded; distance between nostrils about equal to distance from posterior nostril to eye; anterior nostril in a delicate tube, the posterior portion of which is the highest; interorbital region narrow, flat or very gently concave; eye comparatively small, slightly shorter than snout; snout not protruding beyond premaxillaries; mandible included; maxillary reaching a vertical from middle of eye, its length half that of head; teeth finely villiform, in a wide band on premaxillaries, a narrower band on mandible, and apparently a single series on head of vomer; palatines toothless; branchiostegals 7, gill membranes united anteriorly by a delicate membrane which is free from isthmus; gill-rakers on outer arch 5 + 11, the longest $\frac{1}{10}$ head; a moderate slit behind fourth gill; pseudobranchiæ reduced, covered by membrane.

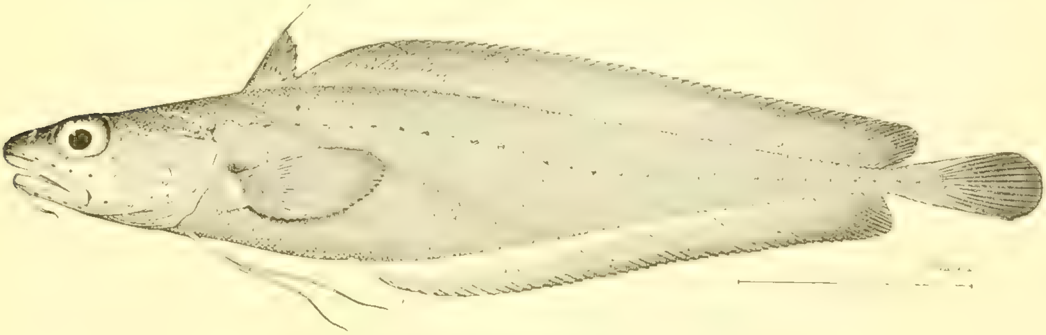


FIG. 255.—*Læmonema rhodochir* Gilbert, new species. Type.

Distance from tip of snout to origin of dorsal 3.7 in total length without caudal, the front of dorsal vertically above base of lower pectoral rays; base of first dorsal equal in length to half the ocular diameter, its first ray slightly produced, half length of head, the others regularly graduated; notch between dorsals not reaching base of fin; some of the posterior dorsal rays longer than those which precede them; median caudal rays slightly more than half length of head; vent vertically below seventh or eighth ray of second dorsal, its distance from tip of snout 0.4 total length to base of caudal; ventral rays attached for slightly more than basal third, the inner ray a little longer than the outer, extending to base of third anal ray, its length equaling that of head; pectorals reaching beyond front of anal, their length 1.4 in head; lateral line distinct throughout its course.

Scales covering head, except mouth parts, branchial membranes, suborbitals, and the greater part of snout; on snout they are confined to 2 narrow lines, which diverge forwards and pass above nostrils.

Color in life, light brownish; belly pale blue; dorsal and anal dusky, with a submarginal black streak, the margin white; caudal largely black; pectorals orange-red; ventrals white; terminal half of anterior dorsal ray white; axil of pectorals blackish.

A single specimen known.

Family MACROURIDÆ.

Gadomus melanopterus, new species. Fig. 256.

Type, 273 mm. long, from station 4028, vicinity of Kauai Island, depth 444 to 478 fathoms; type, No. 51606, U. S. Nat. Mus.

Head 5.7 in total length; depth 6.3; head and trunk 3.3; pyloric cæca long, 15 in number. D. II, 9; P. 17–19; V. 9; 27 scales in an oblique series from first anal ray to middle of first dorsal.

Head and body compressed, head narrow and rather firm, mucous cavities less developed than in the majority of the species; greatest width of head equal to length of snout and eye, 0.6 the greatest depth of head; end of snout nearly vertical, profile thence to occiput gently concave; mouth large, terminal, oblique; maxillary reaching well beyond vertical from hinder margin of orbit, its length 1.7 in head; mandibular barbel very long, extremely slender and delicate toward tip, equaling length of maxillary; vertical diameter of eye 10 mm., horizontal diameter 12, interorbital width 11, length of snout 14; horizontal diameter of eye contained 4.3 times in head; hinder margin of eye 0.1 its own diameter in advance of the middle of head; teeth minute, equal, depressible, in narrow bands in each jaw, the premaxillary band extending to extreme angle of mouth, the length of mandibular band 0.2 less; mandible everywhere well included; teeth of jaws nowhere opposed; in both jaws the bands of teeth are interrupted for a short distance on median line; palate toothless; gill-openings very wide, the membranes free anteriorly, not joined to isthmus; anterior end of gill-slit in advance of vertical from front of pupil; a thick valve-like fold of membrane on outer wall of gill-cavity, parallel with outer gill, but every-

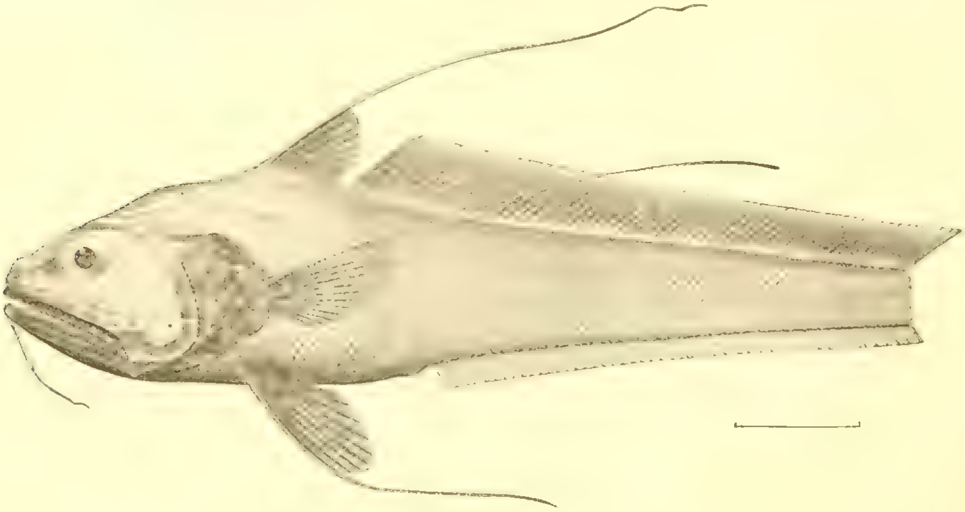


FIG. 256.—*Gadomus melanopterus* Gilbert, new species. Type.

where free from it; outer set of gill-rakers of first arch numerous, long, and slender, 5 or 6 above angle, 27 below, the longest 0.6 horizontal diameter of orbit; pseudobranchiæ absent; a well developed slit behind last gill, the latter bearing 2 sets of gill-filaments; scapular foramen wholly within the hypercoracoid; branchiostegals 7.

Origin of first dorsal fin slightly in advance of base of pectoral; first ray very short, concealed in the membrane, the second slender and smooth, produced into a long unarticulated filament, the length of the spine contained 1.9 times in total length; succeeding rays all deeply forked, except the last, which is apparently simple; interval between first and second dorsals not exceeding twice the space between 2 succeeding rays of either fin; origin of second dorsal over middle of abdomen, its rays high, $\frac{3}{7}$ length of head; tip of tail truncate, having been injured and then again surrounded by the fin; anal much lower than dorsal, the longest rays, in posterior part of fin, about 0.4 the longest dorsal rays; vent immediately in advance of anal fin; outer ventral and upper pectoral rays greatly elongate and filamentous, finely articulated throughout, with a minutely beaded appearance; ventral filament contained 3.2 in total length, pectoral filament 2.6; insertion of ventrals slightly posterior to base of pectorals.

Scales very caducous, and mostly fallen. They seem to have been absent on terminal portion of snout, and on suborbital region, but were otherwise present on top and sides of head, and on entire body; a single series of unimbricated oval scales extends the length of mandible; scales have been studied from the lateral line and adjacent areas, from the base of the dorsal fin, the region about pectoral fin, breast and belly, and the mandible; all are alike cycloid and spineless, marked with extremely numerous delicate concentric striæ; under a high power, each of the striæ is seen to be composed of a series of minute granules, which render the scale slightly rough; lateral line runs along middle of side, furnished with conspicuous pores; no lateral line along back.

Color in spirits very light brown, the margins of scale pouches black; belly, breast, gill-membranes and gular membranes, lips, and entire lining of mouth and gill-cavity jet-black or blue-black; base and axil of pectoral, and entire prepectoral area jet-black; mandible black in its symphyseal third, the remainder of its length, together with the opercles and the suborbital translucent, thus permitting the black lining to be externally visible; snout light, blackish at tip and about nostrils; fins jet-black, only the filamentous rays light; peritoneum jet-black; much black pigment also in the walls of stomach and intestines; pyloric cæca colorless.

The type only was obtained. The species is apparently closely related to *G. longifilis* Goode and Bean, *G. dispar* Vaillant, and *G. multifilis* Günther. It differs from all of them in certain minor details of measurements and fin counts, and in the black coloration of the fins. With our present knowledge of the distribution of bathybial fishes, it seems unwise to identify at long range, at least without direct comparison of adequate material. Alcock's "*Bathygadus longifilis*" from the Arabian Sea is probably distinct from Atlantic or Mediterranean species.

A young specimen, 113 mm. long, from station 4007, vicinity of Kauai, 508 to 557 fathoms, differs in the following respects: Interorbital width greater, equaling length of snout, a little longer than longitudinal diameter of eye; ventrals with 8 rays, pectorals 22 or 23, and dorsal 12; first dorsal, pectoral, and ventral rays elongate, but injured, so their length could not be determined; barbel slightly more than half length of head; fins light in color. This may represent a species distinct from *G. melanopterus*, distinguished by the wider interorbital, the more numerous pectoral rays, and the light fins. It is impossible to make any satisfactory comparison with *G. multifilis* Günther, described from a single specimen 5 inches long, taken in the vicinity of the Philippines, but *multifilis* is said to have 8 dorsal and 15 pectoral rays.

Gadomus bowersi, new species. Fig. 257.

Type, 465 mm. long, from station 4151, vicinity of Bird Island, 313 to 800 fathoms; type, No. 51658, U. S. Nat. Mus.

Head 5.3 in total length; depth 6.3. D. II, 8; V 9; P 17. Gill-rakers 5 +21; branchiostegal rays 7; pyloric cæca long, 18 in number.

Head very wide and deep, with greatly developed mucous canals, and delicate bones and membranes; top of head flat, sides nearly vertical; interorbital width equal to distance from tip of snout to middle of orbit, contained 2.6 times in length of head; longitudinal diameter of eye contained 1.8 times in interorbital width, 1.6 in snout, length of snout 3.4 in length of head; mouth terminal, oblique, its width at angle .7 its length; maxillary reaching vertical through middle of head, its length contained 1.8 times in head; teeth minute, equal, arrow-shaped at tip, in a broad band in premaxillaries, where they reach angle of mouth; mandible wholly included anteriorly and laterally, its teeth not opposed to those in upper jaw; mandibular band narrower and shorter; no trace of a mandibular barbel; suborbital wide, its vertical width below middle of orbit contained 6.5 times in head and equaling greatest width of the dilated preopercular limb; distance from hinder margin of orbit to preopercular angle equal to half length of head; the middle of length of head falls behind orbit a distance equaling half diameter of pupil; the front margin of nape is midway between tip of snout and front of dorsal; two ribs diverge from upper anterior opercular angle, the upper low and flat, passing horizontally backward to end in a flat spinous point, the lower passing backward and downward, much narrower and stronger, and terminating in a definite narrow spine; rarely a trace of a third rib above the upper one described; when present, it is found only on dissection, and terminates far in advance of the upper spine; posterior portion of interopercle forming a narrow lobe which projects downward and backward beyond preopercle. Gill-membranes joined anteriorly, and forming a free fold across isthmus, with which they are not connected; anterior end of gill-slit behind orbit; width of fold half as long as eye; branchiostegals 7; gill-arches all containing double series of filaments, the fourth with a short slit behind it; outer gill-rakers long and slender, 6 + 22 in number; few very small pseudobranchial filaments; hypercoracoid perforate near middle of its height; origin of dorsal fin slightly in advance of pectorals.

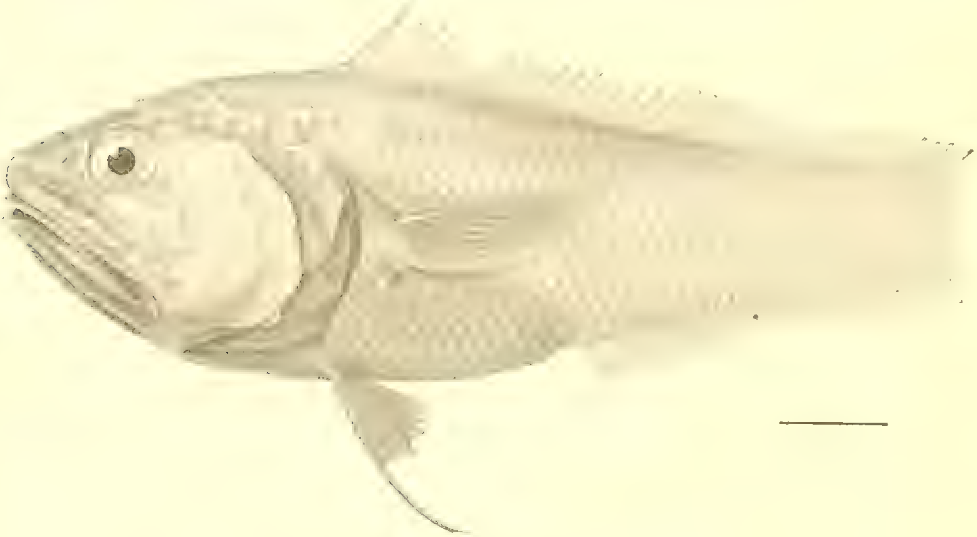


FIG. 257.—*Gadomus bowersi* Gilbert, new species. Type.

Rays of the first dorsal are so badly broken in the type that nothing can be said of their character. In a cotype, 267 mm. long, from the same locality, the rays are seen to be very slender and fragile, all simple, apparently none of them produced, the second but little more than ¼ length of head. The 2 dorsals are closely contiguous; second dorsal higher than anal, but all the rays are injured; vent separated by its own diameter from front of anal, which is vertically below eighth ray of second dorsal; pectoral long and narrow, the second ray produced beyond the others, reaching to opposite fourth or fifth anal ray, equaling distance from tip of snout to upper angle of preopercle; outer ventral ray elongate, nearly reaching vent, ⅗ length of head.

Scales unarmed, thin, fallen over the greater part of all the specimens; they are very finely concentrically striated, the striæ very finely granular; lateral line not positively determined; anteriorly, it seems to be represented by a series of distant pores parallel with back along upper line of division in body musculature, but this may not be its true position; 5 scales are present between this line and base of anterior ray of second dorsal; 21 in a series upward and backward from first anal ray to base of dorsal; scales on head very large, more than twice those on sides of body; they entirely invested head, including snout and mandible, except the gill-membranes.

Dorsal brownish on body and top of head; belly, breast, opercular and gular membranes blue-black; snout and side of head also blackish, this being especially marked in young examples, where the deeper lying black pigment is seen through the translucent surface tissues; mouth and gill-cavities and abdominal cavities lined with black.

In the 6 specimens obtained, the ventral rays are constantly 9 in number; the dorsal formula is II, 8 in 2 specimens, II, 9 in 4; the pectoral varies from 17 to 19, and the gill-rakers in all except the type, number 6 or 7 on the vertical limb, 22 to 24 on the horizontal limb of the outer arch.

The present species resembles in appearance *Bathygadus cottoides* Günther, from New Zealand and the Kermadec islands, but differs generically in the presence of a slit behind the last gill, and in the position of the scapular foramen. Like *B. cottoides*, it has a very soft cavernous head, with excessive development of the system of sensory canals, and very thin delicate membrane bones. The head is also very wide and subquadrate, with nearly vertical cheeks, and lacks any trace of a mandibular barbel. In addition to the generic characters, the 2 species differ in the number of dorsal and pectoral fin-rays, the number of gill-rakers, and the relative lengths of snout, interorbital width, and orbital diameter. Direct comparison of specimens has not been possible. Because of the presence of a slit behind the last gill, and the position of the scapular foramen, which is wholly within the hypercoracoid, this species is placed in the genus *Gadomus* Regan. Its relations with *G. longifilis*, the type of *Gadomus*, seem, however, remote, as is indicated by the absence of a barbel and by the entire habit of the fish.

The species was taken at the following stations: Nos. 3977, vicinity of Bird Island, 876 to — fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4151, vicinity of Bird Island, 313 to 800 fathoms.

Melanobranchus micronema, new species. Fig. 258.

Type, 235 mm. long, from station 4094, Pailolo Channel, between Maui and Molokai, depth 753 to 787 fathoms; type, No. 51643, U. S. Nat. Mus.

Head 5.2 in total length; depth 6.7; head and trunk 3.2. D. II, 10; P. 18; V. 8. 29 scales in an oblique series upward and forward from first anal ray to base of dorsal; pyloric cæca very large, 9 in number.

Head wider and somewhat softer than in *Gadomus melanopterus*, the greatest width of head exceeding length of snout and eye, contained 1.7 times in length of head, 0.7 the greatest depth; snout wide and low, bluntish at tip, its greatest width equaling distance from its tip to posterior margin of pupil; longitudinal diameter of eye equal to interorbital width, 4.5 in the head; snout longer, 3.6 in head; mouth terminal, but little oblique, the mandible everywhere included, shutting wholly within the premaxillary teeth; maxillary extending beyond vertical from hinder margin of eye a distance equal to 0.6 diameter of orbit; mandibular barbel minute, its free portion not more than half a millimeter long; teeth minute, equal, slightly depressible, in narrow bands in each jaw, the premaxillary band reaching angle of mouth, the mandibular band shorter; palate toothless; preopercle narrow with parallel margins; opercle and subopercle terminating posteriorly in weak spinous points, which are concealed in the membrane; gill-membranes joined anteriorly, but free from isthmus, across which they form a moderate free fold; outer set of gill-rakers very long and slender, the longest .6 diameter of eye; gill-rakers 35 in number, 6 or 7 on vertical limb of arch; branchiostegals 7; gills 4, a wide slit behind last arch; no pseudobranchiæ; scapular foramen between the hypercoracoid and the hypocoracoid.

Origin of first dorsal slightly in advance of base of pectorals; first dorsal spine very short and concealed, the second elongate, filiform, .9 length of head; remaining rays forked as well as articulated, except the last 3, which are simple; interval between the dorsals a trifle wider than that separating the successive rays of the second dorsal; second dorsal rays very high, the longest uninjured ray .3 length of head; tail injured, blunt at tip, surrounded by the fin; anal origin vertically below thirteenth ray of second dorsal, the rays all very short; upper pectoral ray very elongate, reaching thirty-sixth ray of second dorsal, its length (85 mm.) contained 2.7 times in total length; outer ventral ray also elongate and filamentous; injured in the type, its broken tip reaching base of fifth anal ray, 40 mm. long; a very short interval separates vent from front of anal fin; base of ventrals midway between front of anal fin and middle of mandible.

Scales fallen, with the exception of 2 or 3 along the course of the lateral line, which runs along middle of sides, and describes anteriorly a convex curve above pectoral fin; scales like those observed in other species of the genus, without spines, marked with very numerous striæ, which are roughened by a series of minute prominences; they covered entire body, but their presence on head can not be verified, owing to the condition of the type.

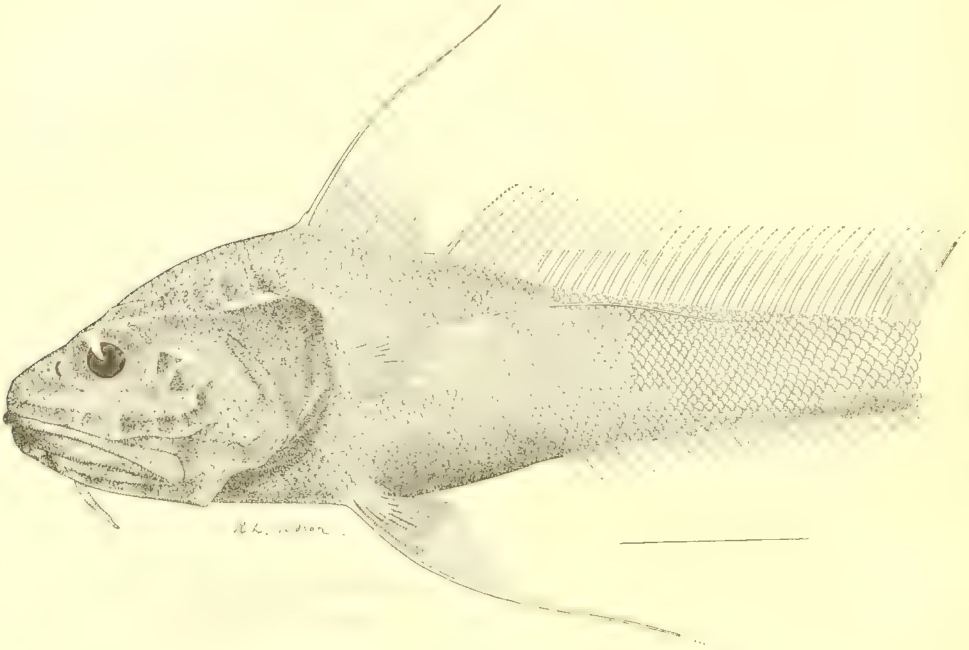


FIG. 258.—*Melanobranchus micronema* Gilbert, new species. Type.

Color, head and fins light grayish, margins of the scale pouches dusky; head light grayish on top and sides, except opercle and gill-membranes, which are black; belly, gill and gular membranes, and the inner lining of cheeks and opercles black; breast, shoulder girdle, isthmus, lips, and lining of mouth dark brownish; peritoneum dusky.

A single specimen was obtained.

Chalinura ctenomelas Gilbert & Cramer.

This a very abundant species in depths of 250 to 350 fathoms.

As seen from above, the terminal portion of snout is broadly triangular, tapering rapidly forward to the angular tip, which is about on level of middle of eye; maxillary reaching to or slightly beyond hinder margin of orbit, its length slightly less than half length of head; outer series of enlarged teeth in upper jaw weakly arrow-shaped, the shape most apparent in the lateral teeth of the series; the villiform mandibular teeth are in 3 irregular series and have distinctly arrow-shaped tips, as have also those of the mandibular band, which are arranged in 2 irregular series; angle of preopercle produced, the posterior margin running obliquely upward and forward, incurved above the angle; spinelets on scales not arranged in longitudinal series, but in definite oblique series (quincunx order).

A small naked pit lying between bases of ventral fins is separated by a narrow band of scales from the scaleless area surrounding anal opening; in some specimens the 2 areas seem to be connected by a narrow naked line, in others by a broader naked streak, but it is considered probable that these conditions were due to the loss of scales; distance between dorsals varying from twice to nearly thrice the base of anterior dorsal; mouth-cavity white, black only in extreme posterior part; gill-cavity largely white anteriorly, black above gills, on opercular region, and lining of shoulder-girdle.

The stomach contains remains of small shrimp-like crustacea, and the eyes and jaws of squids.

Specimens were taken at the following stations: Nos. 3865, Pailolo Channel, 256 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3916, off the south coast of Oahu, 299 to 330 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4084, off the south coast of Maui, 253 to 267 fathoms; 4085, off the south coast of Maui, 267 to 283 fathoms; 4086, off the south coast of Maui, 283 to 308 fathoms; 4087, approach to Pailolo Channel, 306 to 308 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4090, approach to Pailolo Channel, 304 to 308 fathoms; 4097, approach to Pailolo Channel, 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4134, vicinity of Kauai, 225 to 334 fathoms.

Chalinura ctenomelas Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 430, pl. XLV, fig. 2.

Optonurus atherodon Gilbert & Cramer.

One of the most abundant species of Hawaiian *Macrurids* between 250 and 400 fathoms.

The original description may be amended in the following respects: Ventral fins with 9 or 10 rays; snout short, projecting but little beyond mouth, its length contained 1.2 times in orbit, its preoral portion 3 to 4 times in orbit; median rostral ridge ending freely between orbits, not joining a transverse ridge, a delicate, thread-like cord connecting it with orbital margin; the small curved ridges on occiput, mentioned in the description of the type, are delicate long spicules bridging the excavated space between occiput and orbital margin; maxillary extending well behind middle of orbit, to a vertical line intersecting eye midway between pupil and posterior border of orbit; posterior margin of preopercle extending somewhat obliquely upward and forward; barbel about 0.3 length of orbital diameter; all the teeth in both jaws are distinctly arrow-shaped at tip; premaxillary villiform band about 6 teeth wide; mandibular band consisting of an inner irregular series of slightly enlarged teeth, and an outer irregular series of smaller teeth, both series terminating at the same point laterally.

Interspace between dorsal fins 2.5 times the base of anterior dorsal; pectorals 0.6 the length of head; pyloric cæca 97 in the single specimen examined as to this point; a distinct, small, naked pit between bases of ventral fins, separated by a narrow band of scales from the naked area around vent. The food consists of shrimp-like crustacea and squid. In life, the dorsal region is bright blue.

Taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3979, vicinity of Bird Island, 222 to 387 fathoms; 3988, vicinity of Kauai, 165 to 469 fathoms; 4021, vicinity of Kauai, 286 to 399 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4041, off the west coast of Hawaii, 253 to 382 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4087, off the north coast of Maui, 306 to 308 fathoms; 4089, off the north coast of Maui, 297 to 304 fathoms; 4090, off the north coast of Maui, 304 to 308 fathoms; 4091, off the north coast of Maui, 306 to 308 fathoms; 4097, off the north coast of Maui, 286 fathoms; 4107, Kaiwi Channel, 350 to 355 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4123, off the southwest coast of Oahu, 352 to 357 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms.

Optonurus atherodon Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 431, pl. XLVI, fig. 1.

Hymenocephalus antræus Gilbert & Cramer.

The most abundant *Macrurid* about the Hawaiian Islands in depths of 250 to 350 fathoms, where it occurs in company with *Chalinura ctenomelas*, *Optonurus atherodon*, and *Malacocephalus hawaiiensis*. It is much smaller than either of these species, reaching a length of only 20 centimeters, and is characterized by the excessive development of the sensory canals, which are covered by a very delicate membrane and supported by fragile plates and crests. Dentition weak, composed of minute villiform teeth in very narrow bands, the latter tapering laterally, but comprising usually at least 2 series of teeth to their ends; with considerable magnification, the teeth are seen to be dilated and flattened below the tip, distinctly lance-shaped; mouth terminal, very slightly overpassed by the prominent median point of snout; maxillary falling a little short of a point opposite hinder edge of orbit; horizontal and vertical diameters of orbit equal, 0.4 the length of head; posterior margin of preopercle extending obliquely upward and forward; a small opaque lens-like body, resembling a photophore, occupies the middle of the breast, and is connected by a raised black line below the peritoneum with a similar body immediately before the vent.

Scales very thin and deciduous, many of them smooth and unarmed, as described in the type. Others may have a few (1 to 10) short, scattered spines, wholly without definite arrangement.

In specimens taken July 21 at station 4088, the eggs have nearly reached maturity, the ovaries exceeding in size all other contents of the abdominal cavity. They are so uniform in their development in some twenty specimens examined as to suggest a definite breeding season in this species. The ovaries are completely united in their posterior third, but diverge anteriorly. The stomach contains largely digested remains of small crustacea. There are but few (about 12) pyloric cæca.

The peculiar and highly developed color-pattern of the gular membrane, sides of throat and area on outer side of base of ventrals has been pointed out in the original description of the species. In addition to the conspicuous dark line along middle of side of tail, there is a band of dark specks above this line, separated from the base of anterior part of dorsal fin by a colorless streak; below the middle of tail is a wide colorless band, then a narrow streak composed of black specks, separated from base of anal by a narrow colorless streak; posteriorly, all the dark streaks blend, the terminal portion of tail being distinctly blackish; tip of snout marked by a narrow black transverse line, often interrupted; lining of mouth largely colorless; the bands of teeth black; a transverse black arch overlying palatines and head of vomer, and a black streak on floor of mouth in front of tip of tongue; linings of shoulder girdle and branchiostegals black.

There can be no doubt of the close relationship between the 2 Hawaiian species of *Hymenocephalus* and the Atlantic *H. italicus* Giglioli, the type of the genus. They agree not only as regards the smooth dorsal spine and the large terminal mouth with narrow bands of minute equal teeth, but in the presence of the peculiar coloration above base of ventral fin, and the small tubercle on the median line of breast. In *H. italicus*, the last-mentioned characters are described by Collett (Poissons de l'Hirondelle, 1896, p. 87), in the following terms: "Immédiatement au-dessus des ventrales, la peau du ventre est legèrement rayée, du moins chez les jeunes individus; ces raies descendent vers la ligne ventrale. En avant des ventrales, on remarque sur la ligne médiane du corps une petite protubérance mamillaire ronde." The 3 species agree also in their very small size, the great development of the cephalic mucous cavities, and the extremely caducous scales, which show a strong tendency to loss of spines. Compared with *H. italicus*, the Hawaiian species are signalized by almost total loss of the mandibular barbel, and by increase in number of ventral rays. Other species referred to *Hymenocephalus*[a] seem not to share the common characters above noted, and may with advantage, perhaps, be removed from the group.

Specimens were obtained at the following stations: Nos. 3865, Pailolo Channel, 256 to 283 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3898, Pailolo Channel, 258 to 284 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3909, off the south coast of Oahu, 308 to 322 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3916, off the south coast of Oahu, 299 to 330 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 4021, vicinity of Kauai, 286 to 399 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4087, Pailolo Channel, 306 to 308 fathoms; 4088, Pailolo Channel, 297 to 306 fathoms; 4089, Pailolo Channel, 297 to 304 fathoms; 4090, Pailolo Channel, 304 to 308 fathoms; 4091, Pailolo Channel, 306 to 308 fathoms; 4105, Pailolo Channel, 314 to 335 fathoms; 4106, Pailolo Channel, 335 to 350 fathoms; 4140, Pailolo Channel, 339 to 437 fathoms.

Hymenocephalus antraeus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 428, pl. XLVI, fig. 2.

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[a] The above was written before the description of *H. striatissimus*, *H. papyraceus*, and *H. lethonemus* from Japan (see Jordan & Gilbert, Bull. U. S. F. C. for 1902, pp. 612–616), all of which possess the above-mentioned characters of the genus.

Hymenocephalus striatulus, new species. Fig. 259

Type, 144 mm. long, from station 4122, off the southwest coast of Oahu, depth 192 to 352 fathoms; type, No. 51611, U. S. Nat. Mus.

Very closely related to *H. antraeus*, differing in the much more slender habit, the smaller eye, with the horizontal diameter much longer than the vertical, the more projecting snout, the more numerous ventral rays, and the more spinous scales.

Depth of body equaling length of snout and eye; head 4.8 in total length. D. ii, 9 (to ii, 11); V. 15 (usually 14); P. 15 (15 to 18).

Head and body very slender; anterior profile not strongly arched as in *H. antraeus*; projecting point at tip of snout more prominent than in *antraeus*, extending well beyond mouth; skull papery, with excessively large sensory canals inclosed by delicate membrane; mouth large, oblique; maxillary reaching vertical from hinder margin of orbit; mandibular barbel usually obsolete, to be made out in one specimen with the aid of a lens; teeth minute, in narrow bands in the jaws, the mandibular band about half width of premaxillary band; interorbital width equal to length of snout; eye elliptical, its vertical diameter contained 1.4 times in the horizontal diameter, which is 0.3 length of head; preopercular angle broadly rounded, with crenulated border, the posterior edge oblique; gill-membranes rather narrowly joined anteriorly, entirely free from isthmus; gill-slits wide, as in *H. antraeus*.

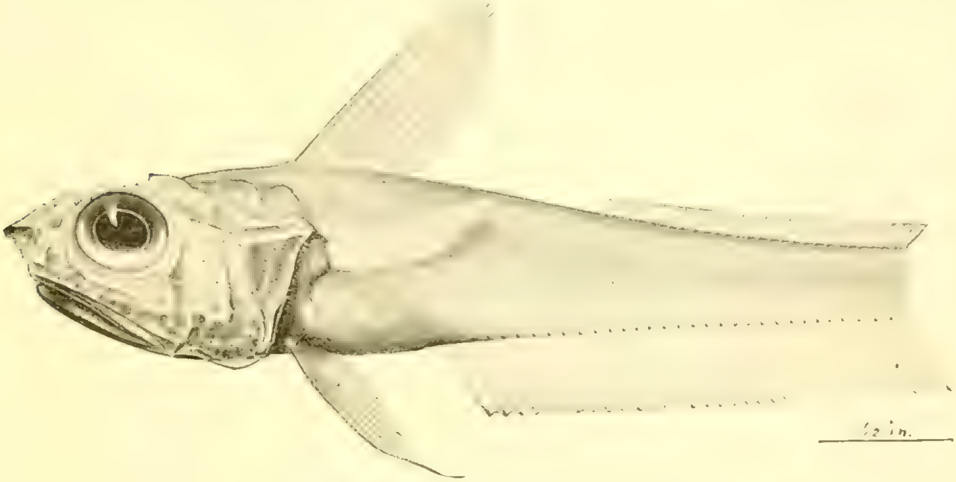


FIG. 259.—*Hymenocephalus striatulus* Gilbert, new species. Type.

Dorsal spine slender and smooth, scarcely longer than some of the succeeding rays; base of first dorsal contained 1.75 times in interspace between dorsals; first anal ray in a vertical a trifle behind last ray of first dorsal; ventrals inserted noticeably in advance of pectorals; pectorals long and slender, their tips extending to opposite fourth or fifth anal ray, their length a trifle more than half length of head; outer ventral ray filamentous, reaching to base of ninth anal ray; vent immediately in front of first anal ray, its distance from base of inner ventral ray equaling distance from the latter to mandibular angle; a small obscure lens-like body on middle line of breast, as in *H. antraeus;* a similar body immediately before vent, the 2 joined by a raised strand along inner abdominal wall; scales very thin and caducous, an occasional patch only being present; 4 series between lateral line and base of first dorsal; those on breast, sides of body and tail essentially similar, and much rougher than in *H. antraeus*, each usually with from 20 to 30 spines, arranged in 4 to 6 parallel oblique series (quincunx order); scales along sides of shoulder-girdle and on under side of mandible smooth.

In color, almost exactly like *H. antraeus*. The body was light olive in life, with narrow dark margins to the scales on the back; lower half of caudal portion of body marked with coarse black pigment spots, many of which are arranged in oblique or horizontal rows; under a lens, the central area of many of these spots shines with metallic luster; somewhat finer specks, more closely crowded, form a wide dark band along middle of tail, which does not show the conspicuous narrow line characteristic of *H. antræus;* a conspicuous black spot at base of each anal ray; dorsal rays not marked; posterior edge of occipital canal jet-black (as in *H. antræus*); a transverse black line on anterior edge of snout; lower side of head, opercle, breast, and belly black, this color extending a little beyond origin of anal fin. As in *H. antræus*, the gular membrane has a black median streak, from which diverge forward and outward a number of fine parallel black lines. A silvery streak along each side of isthmus extending backward and surrounding outer portion of ventral base, crossed with very fine parallel hair lines of black, which can be made out only by the aid of a lens; these lines are as numerous and as fine as the scale striæ; lips and dentary portions of jaws black; roof of mouth shining plumbeous; branchial region largely dusky; a blackish patch in front of tongue; lining of gill-cavity largely dusky.

Specimens were taken as the following stations: Nos. 3920, off the south coast of Oahu, 265 to 280 fathoms; 3986, off Kauai, 55 to 362 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms.

Hymenocephalus aterrimus, new species. Plate 93.

Type, 127 mm. long, from station 3989, vicinity of Kauai Island, depth 385 to 500 fathoms; type, No. 51649, U. S. Nat. Mus.

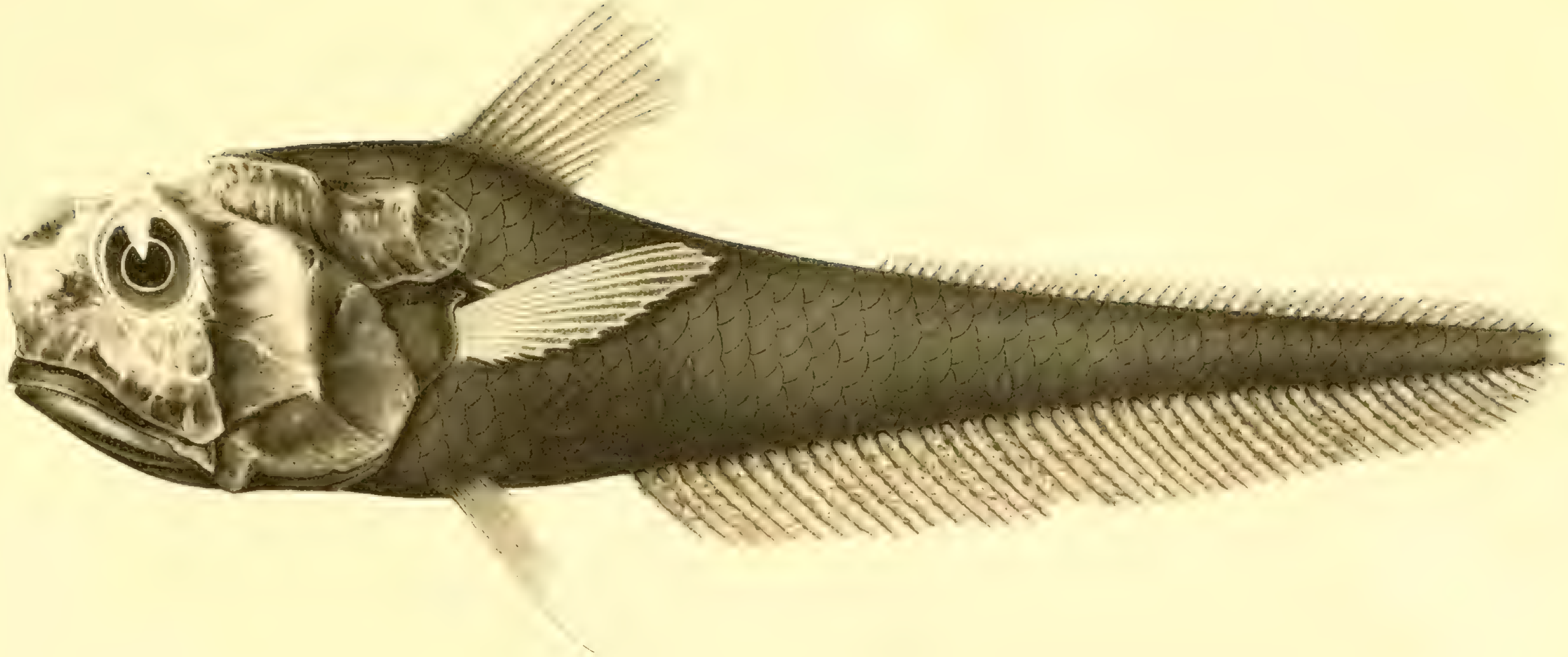
This species is jet-black, and occurs at a greater depth than *H. antræus* or *H. striatulus*. Its range is apparently between 400 and 500 fathoms, where it is found in company with *Macrourus gibber* and *Trachonurus scutipellis*. It is closely related to the other Hawaiian species of the genus, and to *H. italicus*. In addition to the papery cranial crests and the wide mucous canals bridged over with delicate membrane, the wide terminal mouth, the weak dentition and the smooth dorsal spine, the species has thin caducous scales, the peculiar striation on side of throat and region above base of pectoral fin, and the 2 minute lens-like bodies in the median line of the ventral surface.

The depth of the body varies widely with the distention of the abdomen, and also with the curvature of the back, the base of the dorsal fin sometimes forming a greater prominence than in the type. In the latter, the depth at origin of dorsal fin is contained 1.5 times in the length of the head. D. II, 9; V. 13 (usually 14); P. 13 (sometimes 14); 3 rows of scales between position of lateral line and middle of base of first dorsal.

Head very large, compressed, with a very heavy bluntly-rounded snout, which scarcely protrudes beyond premaxillaries; mouth terminal, with the premaxillaries anteriorly wholly below orbit; cleft oblique; maxillary reaching slightly beyond vertical from posterior margin of orbit, its length 1.85 in head; teeth very short and slender, but somewhat longer than those in *H. antræus* and *H. striatulus*, arranged in narrow bands in both jaws, the inner series evidently longer than the outer but still very small; all the teeth are depressible; with a lens they are seen to be arrow-shaped at tip; barbel wanting; eye small, shorter than snout, and but half width of interorbital space; preopercle very widely expanded, its angle broadly rounded, its upper limb oblique and convexly curved; around preopercular angle the margin is rather coarsely crenate; gill-membranes moderately joined anteriorly, wholly free from isthmus; gill-slits wide, the membranous attachment to the first arch encroaching less on anterior cleft than in species of *Macrourus;* a narrow slit behind fourth arch; gill-rakers short, sessile, spinous; in uninjured specimens the tail is extremely slender.

As in related species, the first dorsal spine is minute, not evident to the eye; the second spine very slender and wholly smooth, tapering to a very fine point, but not filamentous; the succeeding ray unbranched, but articulated, the 4 following rays forked for a short distance near their tips; other rays simple, unbranched; rays of second dorsal very small, but origin of fin can be made out without difficulty; interspace between dorsals equal to 2.4 times base of anterior dorsal; second dorsal spine 0.6 length of head; origin of anal fin vertically behind first dorsal for a distance equaling diameter of pupil; anal rays high, 0.3 length of head; vent immediately in front of first anal ray; pectoral narrow and long, one of the upper rays elongate, reaching vertical of ninth anal ray, 0.6 length of head; outer ventral ray a long slender filament, reaching the same vertical as pectoral filament, 0.7 length of head; ventrals inserted in advance of pectoral base by a distance equaling diameter of pupil.

Scales large, very thin and caducous, round in outline, with parallel concentric lines whose centers coincide with those of the scales; no spines on any of the few scales examined, these including all the scales of the breast, a few above and behind bases of ventrals, those between pectorals and ventrals, those behind and above bases of pectorals, and one above bases of anterior anal rays; the scales evidently covered the entire body in life, but may have been absent on head.



HYMENOCEPHALUS ATERRIMUS GILBERT. [illegible]

Color uniform black, less intense on side of tail, and on snout and top of head, which are partly translucent; as in other species of the genus, a strip along each side of throat (concealed by the gill-flap) and an area extending above and behind base of pectorals is silvery, crossed by very fine parallel black lines, hardly to be made out without a lens; owing to deposition of black pigment, these striated areas are difficult of detection in some specimens of this species; another generic mark consists in the presence of 2 small opaque lens-like prominences on midventral line, one on middle of breast in front of ventral fins, the other immediately in advance of anal opening; the 2 are connected by a raised strand, evident on inner abdominal wall.

The largest specimen taken is 185 mm. long, with the very slender tail uninjured; the head is 35 mm., the greatest depth 27 mm. In different specimens the interspace between dorsals varies from 2.5 to 1.5 times the base of the first.

The species was taken at the following stations: Nos. 3892, off the north coast of Molokai, 328 to 414 fathoms; 3904, off the north coast of Molokai, 295 fathoms; 3985, vicinity of Kauai, 430 to 477 fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 3997, vicinity of Kauai, 418 to 429 fathoms; 4019, vicinity of Kauai, 409 to 550 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms; 4180, vicinity of Niihau, 417 to 426 fathoms.

Macrourus ectenes Gilbert & Cramer.

This species was not obtained by the expedition of 1902; only the type is known, a young individual 5¼ inches long. It is well distinguished from other Hawaiian species.

Macrourus ectenes Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 423, pl. 41, fig. 1.

Macrourus propinquus Gilbert & Cramer.

Numerous specimens were secured and form the basis for the following notes, which include some corrections and additions to the description of the type.

Head rather small, compressed; snout short and high, its length, its depth, and the width between the nostrils all equal; median tubercle at tip of snout but slightly above middle of pupil; lower anterior profile of snout very oblique, or almost vertical; front of premaxillaries slightly in advance of nostrils; transverse width of mouth slightly less than its length; gill-membranes rather narrowly united across isthmus, with a rather wide free fold posteriorly.

Serræ of second dorsal spine coarse, widely spaced, and evenly distributed along its entire length, about 9 in number in the young, becoming smaller and more numerous (about 15) in adults; the spine becomes filamentous toward its tip, its total length about equaling that of head; the interspace between dorsals varies between three-fourths and four-thirds the length of the base of first dorsal.

Two specimens in the present collection, 23 and 27 cm. long, are much larger than the type, and have the scales provided with more numerous series of spines. Those on the middle of the sides above lateral line have 7 to 11 parallel series of rather long appressed spines, which rise independently from the scale, and are not connected by ridges; scales on head and nape are similar, but smaller and more crowded, with the series of spines parallel or slightly diverging; on the breast the spines are much shorter than elsewhere, the series parallel or slightly diverging; basal half of first dorsal whitish, contrasting strongly with the black distal half.

The pyloric cæca in four specimens number 22, 26, 30, 32. The specimens taken June 21 at station 4021 had been feeding exclusively on small eggs, with which the stomachs of all were distended. At this date the male and female reproductive glands had reached a very moderate development. On August 1, at station 4137, a single specimen was taken, larger than any other obtained, and at a greater depth. In this the eggs were mature, being extruded from the body by the pressure incident on rising to the surface. The stomach was empty and strongly contracted.

The species was taken at the following stations: Nos. 4021, off the east coast of Kauai, 286 to 399 fathoms; 4022, off the east coast of Kauai, 376 to 399 fathoms; 4137, off the east coast of Kauai, 411 to 476 fathoms.

Macrourus propinquus, Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 424, pl. XLII, fig. 2.

Macrourus holocentrus Gilbert & Cramer.

One specimen was taken at station 3909, off the south coast of Oahu, 308 to 322 fathoms.

Head and trunk very slender, the head with rounded outlines and no ridges; longitudinal profile of snout convex; interorbital space and occiput concave; suborbital flat, without ridge; spines on scales long, slender and flexible, bristle-like, closely crowded, but in rather definite parallel series, though not borne upon ridges; on head and along predorsal area, the spines shorter and frequently in radiating lines; mandible naked in this specimen and in one of the cotypes of the species. In the latter there are 8 ventral rays, in the former 9.

The following corrections and additions may be made to the original description: Median rostral tubercle on a level with middle of eye; premaxillaries anteriorly below level of eye; maxillary reaching slightly beyond middle of orbit; gill-membranes with a wide free fold where they cross isthmus; serrations of second dorsal spine small, 11 or 12 in number, evenly spaced along entire spine except the filamentous portion; second dorsal spine very slender; last rays of first dorsal not nearly reaching second dorsal when declined; length of first dorsal base 0.6 the interspace between dorsals; ventral fin, excluding outer filamentous ray, reaching base of second anal ray; back light gray, with some dusky mottlings; lower half of gill-cavity whitish.

Macrourus holocentrus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 425, pl. XLIII.

Macrourus gibber Gilbert & Cramer.

Taken at a number of localities but never abundantly. The following additions and corrections may be made to the original description.

Infraorbital ridge occupying a very oblique position, but not approaching the vertical; tip of premaxillaries far below level of middle of eye, their horizontal plane intersecting eye midway between lower margin of pupil and lower margin of orbit; teeth of outer series not enlarged; posterior margin of preopercle nearly vertical, the angle broadly and evenly rounded; gill-membranes with a narrow free posterior margin on middle line below; dorsal profile ascending strongly to origin of dorsal, then descending abruptly along base of fin, forming a conspicuous triangular hump; length of pectorals 0.7 that of head; lateral line nearly obsolete, membranous tubes present on occasional scales or groups of scales only.

Scales on back and sides thin, deciduous, furnished with very slender, closely appressed spines, which are arranged in parallel series directed somewhat obliquely downward and backward; on the back the series of spines may slightly diverge, as given in the figure above cited; spines distinct, not located on ridges; on breast and sides of head, the scales are thicker and the spines stronger, arranged in series which usually diverge; subocular ridge and the lateral pair of rostral ridges covered with very strongly spinous scales; the 3 rostral tubercles bear rosettes of strong spines; spaces between median and lateral rostral ridges naked, or with a few scattered cycloid scales; lower side of snout and anterior half of space between mouth and subocular ridge naked; mandibles naked, ending posteriorly in a spinous point, which does not project.

Taken at the following stations: Nos. 3842, off the south coast of Molokai, 495 to 506 fathoms; 3985, vicinity of Kauai, 433 to 477 fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 3994, vicinity of Kauai, 330 to 382 fathoms; 3997, vicinity of Kauai, 418 to 429 fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4014, vicinity of Kauai, 362 to 399 fathoms; 4022, vicinity of Kauai, 376 to 399 fathoms; 4028, vicinity of Kauai, 444 to 478 fathoms; 4041, off the west coast of Hawaii, 253 to 382 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4113, Kaiwi Channel, 395 to 433 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms.

Macrourus gibber Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 426, pl. XLIV, fig. 2.

Macrourus burragei, new species. Fig. 260.

Type, 265 mm. long, from station 3917, off the south coast of Oahu Island, in 294 to 330 fathoms; type, No. 51641, U. S. Nat. Mus.

Closely allied to *M. holocentrus*, but with deeper body, blunter anterior profile, larger first dorsal fin, shorter abdomen, and much smaller scales.

First dorsal II, 10; ventral 9; pectoral 20 or 21; 14 scales in a series downward and backward from origin of first dorsal to lateral line, 11 between lateral line and origin of second dorsal (8 in *M. holocentrus*).

Head short and high, compressed, the greatest depth contained 1.2 times in its length; upper profile nearly straight from dorsal fin to snout, a very slight depression above orbits; profile of snout gently decurved to rostral tubercle, descending thence in a vertical line to front of premaxillaries; head firm, without conspicuous mucous cavities, the scales everywhere firmly adherent; snout terminating anterosuperiorly in a tubercle covered with spines radiating in all directions from the center; a pair of smaller spinous tubercles are separated from the first by less than half its diameter; suborbital flat, without ridge; interorbital space narrow, very slightly concave, its width slightly less than length of snout, 0.8 diameter of orbit; upper rim of orbit encroaching on upper profile; snout 0.25 length of head; eye circular, 3.3 in head; distance from rostral tubercle to premaxillaries 0.2 length of head; front of premaxillaries far in advance of nostrils; maxillary scarcely reaching vertical from front of pupil, contained 3.25 in length of head, and equal to width of mouth; teeth in very wide villiform bands in both jaws, the outer series in the upper jaw scarcely enlarged; length of barbel 0.7 diameter of orbit; least width of the suborbital 0.3 diameter of orbit; preopercular angle not produced, the posterior margin nearly vertical, convex in its upper half, concave immediately above the angle.

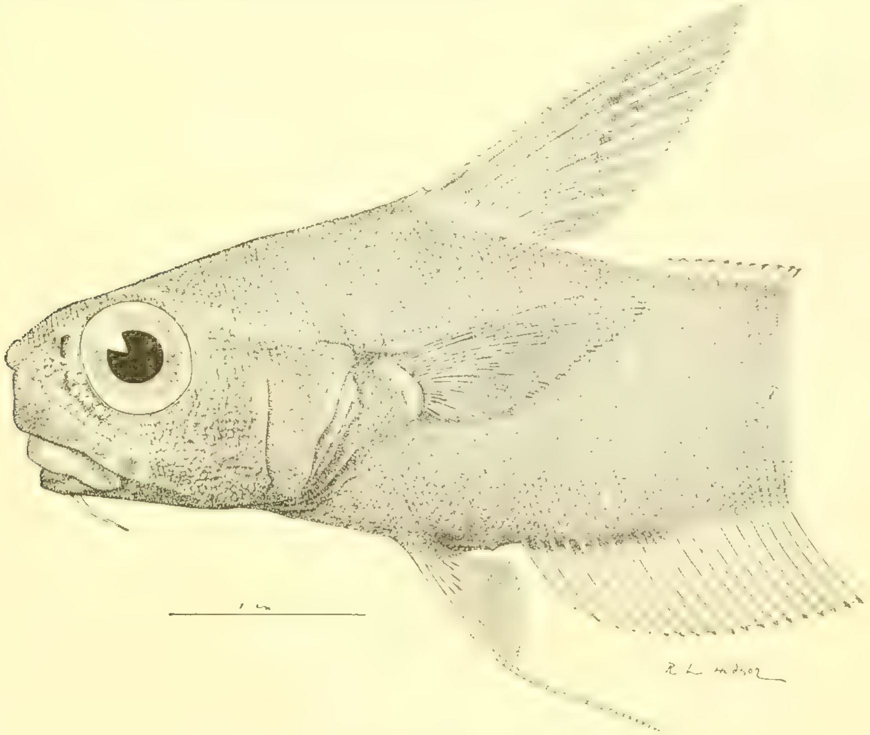


FIG. 260.—*Macrourus burragei* Gilbert, new species. Type.

First dorsal fin very long; second dorsal spine large, provided with 17 rather fine serrations evenly distributed for its entire length, its flexible portion short, its tip scarcely projecting beyond that of the first succeeding ray; total length of spine equaling distance from tip of snout to base of upper pectoral ray; rays of second dorsal very short and inconspicuous, the base of the first ray reached by the seventh ray of first dorsal; interspace between dorsals equal to base of anterior fin; first anal ray under middle of anterior dorsal, its distance from base of inner ventral ray one-half distance from latter to edge of gill-membrane; inner ventral ray reaching anal origin, the other rays extending well beyond it, the filamentous outer ray reaching base of fifteenth anal ray, its length 1.1 in that of head; pectoral wide, extending to opposite eleventh anal ray, its length 1.45 in head; a small naked pit on middle line of breast between the outer ventral rays.

Scales on back and sides densely covered with slender bristle-like spines, which are arranged in numerous parallel series somewhat difficult to determine; on head the spines are much coarser and less numerous, and the series strongly radiate; mandibles, gill-membranes, and the space below suborbitals and rostral ridge naked, the rest of head completely invested; lateral line prominent and continuous, describing a low curve above pectoral fin.

Color light grayish, cheeks and opercles not darker than sides of body; under side of snout, lips, and mandibles blackish, more or less mottled with silvery; gill-membranes purplish black, breast and abdomen dusky; mouth and gill-cavities whitish, lining of abdominal cavity bright silvery, with scattered black specks; membrane of first dorsal silvery with scattered black specks, a few small dark spots on the rays; anal whitish, blackish at base of the anterior 12 rays; pectorals and ventrals dusky, the latter with silvery pigment; ventral filament white.

One specimen only.

Named for Lieut. G. H. Burrage, U. S. Navy, navigating and executive officer of the *Albatross*, to whose efforts was directly due much of the success of the expedition.

Macrourus obliquatus, new species. Fig. 261.

Type, 155 mm. long, from station 4141, off the east coast of Kauai, depth 437 to 632 fathoms; type, No. 51514, U. S. Nat. Mus.

Body very long and slender, depth at origin of dorsal contained 1.6 times in head. First dorsal II, 11; V. 12; P. 22 or 23; scales between lateral line and base of second dorsal spine 9.

Head rather long, with moderately projecting snout, and narrow inferior mouth, which is much overpassed by the snout anteriorly and by the infraorbital ridges laterally; length of snout slightly exceeding vertical diameter of orbit, contained 3.6 times in length of head, its preoral length 0.3 length of head behind snout; snout terminating in a very spinous tubercle directed very obliquely upward; a pair of prominences also on side of snout where each infraorbital ridge joins the ridge which bounds the upper portion of the nasal fossa; from the median tubercle a ridge extends backward nearly to middle of interorbital space, the latter deeply concave; from the supraorbital rim a pair of curved ridges converge backward toward occiput; width of interorbital space equal to 0.7 the long diameter of orbit, which is oblique downward and backward, and equal to 0.3 length of head; front of mouth slightly in advance of nostrils; tip of maxillary scarcely reaching vertical from hinder edge of pupil, its length equaling 0.3 that of head; greatest width of mouth contained 1.7 times in its length; behind angle of mouth, on outer mandibular rim, a short strong compressed spine directed backward; teeth in rather wide villiform bands in both jaws, 12 or 14 of the outer series in the front of upper jaw, at least twice the size of the villiform teeth behind them; cheek produced downward and backward into a narrow rounded lobe encroaching on preopercle; preopercular margin not produced, its vertical

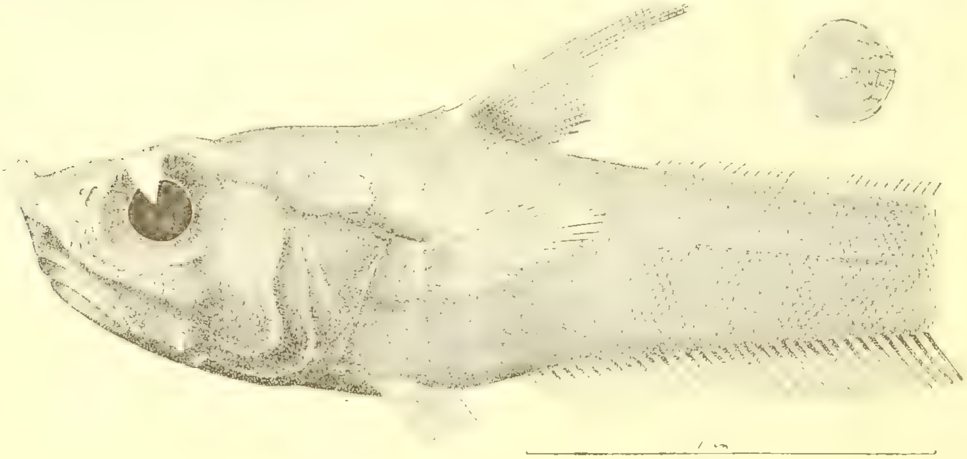


Fig. 261.—*Macrourus obliquatus* Gilbert, new species. Type.

margin straight; gill-membranes rather widely joined across throat and forming a wide free border posteriorly.

Profile but little elevated at front of first dorsal, the base of which is not oblique; second dorsal spine broken, the basal portion bearing 3 strong distantly placed hooks; longest dorsal ray 0.7 length of head; second dorsal very low throughout; base of first dorsal 0.8 the interspace between dorsals; anal low, originating under middle of first dorsal; pectoral extending to opposite twelfth anal ray, its length 0.7 that of head; tips of ventrals injured, so their length can not be given; anal opening anterior in position, its distance from inner base of ventrals being 0.7 its distance from front of anal fin.

Scales on back and sides of body have all been lost; on predorsal region each scale has about 10 slender distinct spines arranged in 1 median and 2 parallel lateral series; the spines of the median series little longer than the others, none of them located on ridges; side and upper part of head, including snout, entirely invested with spinous scales; lower side of snout and anterior half of space between mouth and infraorbital ridge, naked; posterior half of supraoral area scaled continuously with the cheek; mandible with a few scales, the others apparently having been lost.

Color grayish, darkened by the broad dusky margins of the scales; sides and lower surface of head and abdomen jet-black; mouth blackish; lining of opercles black, the gill-cavity otherwise light; lining of abdominal cavity blackish; barbel whitish; ventral fins black, other fins dusky translucent.

But one specimen was procured.

Macrourus hebetatus, new species. Fig. 262.

Type, 125 mm. long, from station 3925, off the south coast of Oahu Island, depth 299 to 323 fathoms; type, No. 51608, U. S. Nat. Mus.

Strongly resembling *M. ectenes* Gilbert & Cramer, also from Hawaiian waters, but differing in the much smaller eye, the number of dorsal and ventral rays, the smooth rostral tubercles, the armature of scales, and the color.

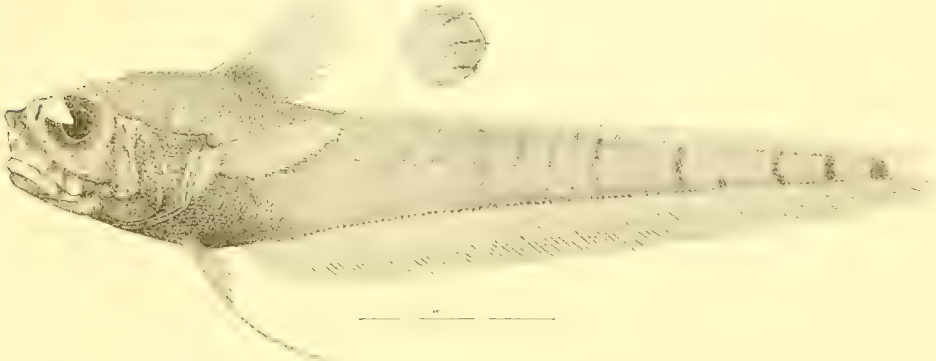


FIG. 262.—*Macrourus hebetatus* Gilbert, new species. Type.

Body rather short and deep, the depth at origin of dorsal contained 1.2 times in length of head. First dorsal ii, 12; V. 8; P. 24; eleven scales in an oblique series from lateral line to base of dorsal spine.

Head short, cuboid, with vertical cheeks and vertical anterior profile to snout; axial length of the very short snout 0.7 its width, which equals the greatest diameter of orbit; snout ending in a small perfectly smooth tubercle, from which extends backward a median ridge, which is angulated at a point midway between nostrils; a sharp ridge bounds the nasal fossa above and joins the supraorbital rim; no distinct lateral pair of rostral tubercles, and no spines on any of the exposed points or ridges; mouth small, slightly oblique, scarcely overpassed by the rostral tubercle or the suborbital ridge; maxillary reaching a vertical line which crosses eye half way between its anterior edge and the front of pupil, its length 3.3 in head; upper jaw with a moderate villiform band of teeth, those of the outer series definitely enlarged, forming small canines; mandibular teeth in a narrow villiform band; barbel small, 0.25 diameter of orbit; distance from front of premaxillaries to rostral tubercle 0.7 diameter of orbit; interorbital space concave, its width contained 1.2 in diameter of orbit; snout and lower side of head naked, save for a V-shaped patch of scales extending from the interorbital space forward, the apex of the V on median line between nostrils; a narrow band of spinous scales surrounding anterior segment of orbit; preopercular angle a little produced, its vertical margin concave; gill-membranes narrowly joined across throat and largely free from isthmus.

Second dorsal spine with 8 strong serrations, evenly spaced, none of these on the basal fourth; filamentous tip short, the entire spine contained 1.4 times in head; interspace between dorsals equal to base of the first; second dorsal very low; anal originating under third or fourth ray of first dorsal, its longest rays equal to length of snout and eye; pectorals long and slender, reaching to opposite seventeenth anal ray, their length 1.5 in that of head; filamentous ventral ray reaching base of twentieth anal ray, its length equaling that of head; distance from vent to axil of ventrals 0.7 its distance from front of anal.

Scales small, very deciduous, mostly lost in the type, 11 in a series from lateral line to base of second dorsal spine; those on back, under origin of second dorsal, have each a strong median ridge which bears 5 short strong spines directed very obliquely backward, and a pair of shorter lower ridges, parallel with the first, and bearing from 1 to 3 similar spines; on breast, head, and antedorsal region the scales are smaller and bear usually the median ridge only.

Color, back and sides grayish, checkered by narrow black lines margining the scales; sides and lower part of head and abdomen jet-black; gill-membranes blackish on inner surface as well as outer, but the lining membrane of mouth and gill-cavity otherwise whitish; peritoneum dusky silvery; along the sides and tail about 12 narrow black cross-lines, the posterior more distinct than the anterior, only a few of them complete; dorsal uniformly dusky, anal translucent, with a wide black margin; pectorals and ventrals, including the ventral filament, blackish.

Only the type known.

Macrourus longicirrhus, new species. Fig. 263.

Type, 590 mm. long, from station 4185, vicinity of Kauai Island, depth 1,000 to 1,314 fathoms; type, No. 51592, U. S. Nat. Mus.

Body robust, depth 5.5 in total length; head 4.55. First dorsal II, 10; V. 11; P. 21; scales between lateral line and base of second dorsal spine 6.

Head depressed above orbits, a low convex curve thence to dorsal, the base of which does not form a projection; contours of snout evenly and bluntly rounded; cheeks and suborbitals nearly vertical, without projecting ridges or prominences; interorbital convex and very wide, 3.5 times in length of head; horizontal and vertical diameters of orbit equal, 1.4 in interorbital width, 5 in head; snout projecting but little beyond mouth, its length contained 3.25 times in head; distance from premaxillaries to tip of snout 0.12 length of head; maxillary reaching a vertical from middle of orbit, its length 2.4 in head; mandible well included; premaxillary teeth in a moderate band; posterior teeth villiform; outer teeth enlarged, forming small canines, the enlarged teeth including some behind the outer series; the premaxillary band narrows laterally, but contains always smaller teeth behind an outer series; mandibular teeth uniform in size, intermediate in size between inner and outer premaxillary teeth; they form at symphysis a very broad band which tapers rapidly toward sides; barbel .17 length of head; nostrils small, the anterior round, with its posterior membranous margin elevated, the posterior vertically slit-like; preopercular angle greatly produced backward, the margin above angle deeply indented; gill-membranes widely joined anteriorly, adnate to the isthmus, without free posterior edge; branchiostegals 6; outer branchial slit very short, the arch almost wholly adnate; length of slit but 0.3 diameter of orbit; slit behind fourth arch slightly wider; pseudobranchiæ present, small.

Second dorsal spine compressed, rather slender and flexible, its anterior margin furnished with a few very fine serrulations; it is produced to a short filamentous tip, which reaches base of twelfth ray of second dorsal, and is more than 0.9 length of head; first soft ray 0.8 length of head; interspace between dorsals slightly exceeding in length base of first, and contained 3.4 times in head; origin of anal vertically below beginning of last third of interspace between dorsals; all anal rays injured, the longest present being .2 the length of head, and much longer than rays of second dorsal; vent immediately in front of anal fin; outer ventral ray greatly produced, reaching base of nineteenth anal ray, 0.25 total length; pectoral reaching to opposite twenty-second scale of lateral line; none of its rays produced, the longest 1.7 in head.

Scales large, adherent, those on anterior part of head greatly reduced in size; they densely cover entire head, including snout, the suborbital region, and the posterior 0.7 of the mandibular rami; gular and gill-membranes bare; on middle of sides each scale bears numerous very short appressed spines, arranged usually in 16 or 18 parallel series; there is some irregularity in the arrangement of the spines, which sometimes break rank and show a tendency to form in quincunx order; in the smaller scales of snout and interorbital area the spines are greatly crowded, stand out vertically from the scales, and are sometimes arranged in diverging series; there are 26 series of scales in advance of origin of second dorsal fin.

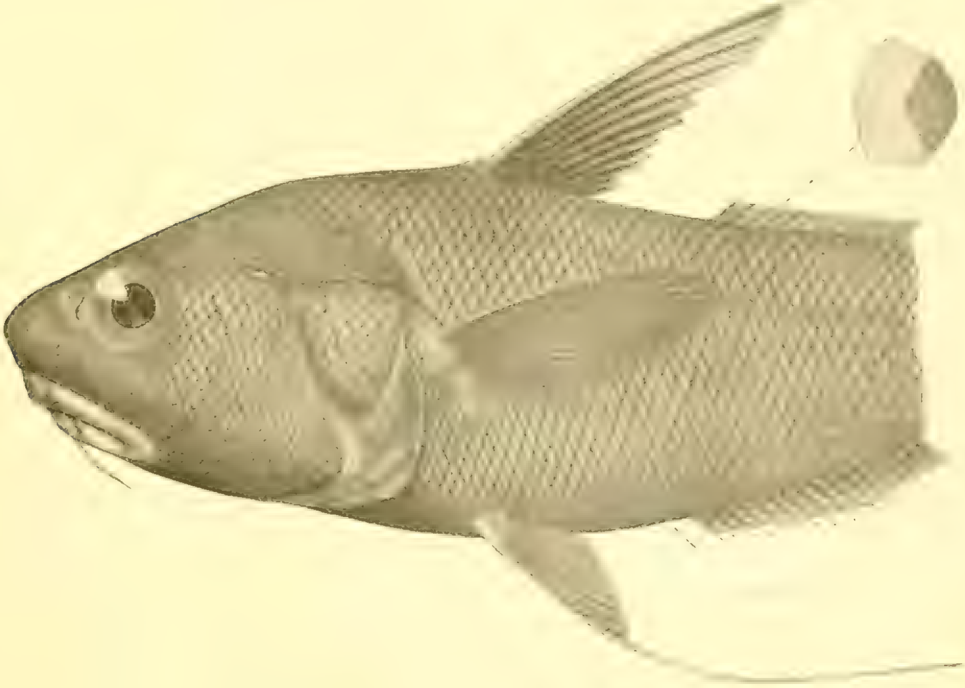


FIG. [illegible]3.—*Macrourus longicirrhus* Gilbert, new species. Type.

Color uniform dark brown or purplish brown on head, body, and fins; gill-cavity similarly colored; inside of mouth lighter; peritoneum white, or only faintly dusky; barbel and ventral filaments white, dorsal filament colored like rest of fin.

Only the type known.

Cœlorhynchus gladius Gilbert & Cramer.

Six specimens of this rare species were secured. In the longest specimen, 238 mm., the scales along back near first dorsal fin have 40 to 50 minute equal spinelets, arranged in about 10 series, which are parallel throughout; the spines are thus much more numerous than in the smaller type specimen and in other smaller specimens before us. In the figure of the type cited below, the enlarged cut of the scale is very poor and misleading, the spines being much smaller than there shown, and more closely set. The scales on the head have the spinelets still more minute and more numerous, arranged in slightly radiating series, and giving a rough shagreen-like texture to the head.

The following additions and corrections may be made to the type description: Barbel variable in size, and may equal 0.4 diameter of orbit; gill-membrane with a very narrow free margin behind; outer gill-slit not pore-like, but a slit 0.4 diameter of orbit; distance from inner base of ventrals to origin of anal 0.3 length of head; vent at posterior end of a well-marked naked fossa; lining of mouth whitish anteriorly, becoming dusky toward gullet; gill-cavity slightly dusky, but not black, a dark blotch on operele showing through; peritoneum black; abdomen externally blue-black, the color not dependent upon the peritoneal color; anal whitish anteriorly, becoming blackish behind in adults; in young, the second dorsal and anal are whitish throughout; in adults, the second dorsal is black.

Specimens were obtained at the following stations: Nos. 4116, off the northwest coast of Oahu, 241 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, off the east coast of Kauai, 283 to 309 fathoms; 4132, off the east coast of Kauai, 257 to 312 fathoms.

Cœlorhynchus gladius Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 421, pl. XLI, fig. 3.

Cœlorhynchus aratrum, new species. Fig. 264.

Related to *C. parallelus*, but differing in spination of scales and in the wholly smooth lower side of head, no scales or tubercles being present below the infraorbital ridge, except a very small patch on lower side of snout near its tip.

Type, 313 mm. long, from station 3910, off the south coast of Oahu Island, depth 311 to 337 fathoms; type, No. 51656, U. S. Nat. Mus.

Depth of body slightly more than half length of head; D. II, 8; V. 7; P. 18 or 19; pyloric cæca 9; snout long, depressed, everywhere transversely convex, longitudinally a little concave, ending anteriorly in a short but definite slender spine; width of snout opposite front of orbit equal to its length from base of terminal spine to anterior nostril; lateral outlines of snout convex, the narrowing being much more rapid in its terminal half; width at middle of snout more than half its length; vertical diameter of orbit contained 1.6 times in the longitudinal diameter, which equals the convex interorbital width, and is contained 1.7 times in snout; upper margin of orbit nearly straight; posterior nostril vertically elongate and weakly crescentic, the anterior a roundish pore, separated from the posterior by a narrow black strip of integument; two pairs of low but well-marked spinous ridges on top of head, the outer pair continuous with supraorbital margin, its posterior end immediately in advance of upper end of gill-slit; the inner pair begin in advance of middle of interorbital space, and run in parallel lines over occiput (in *C. parallelus* the inner pair of ridges converge strongly to near their posterior ends, then diverge); median rostral ridge not evident in well-preserved material; the strong infraorbital ridge runs from tip of snout to preopercular lobe, where it is surrounded behind and below by a wide, smooth membrane; upper limb of preopercle made concave by the strongly projecting angle; transverse width of mouth at tips of maxillaries equals half width of snout at same level, and equals length of maxillary; front of mouth opposite posterior nostril or slightly behind that point, the end of maxillary extending to a point slightly in advance of posterior edge of pupil, its length half the

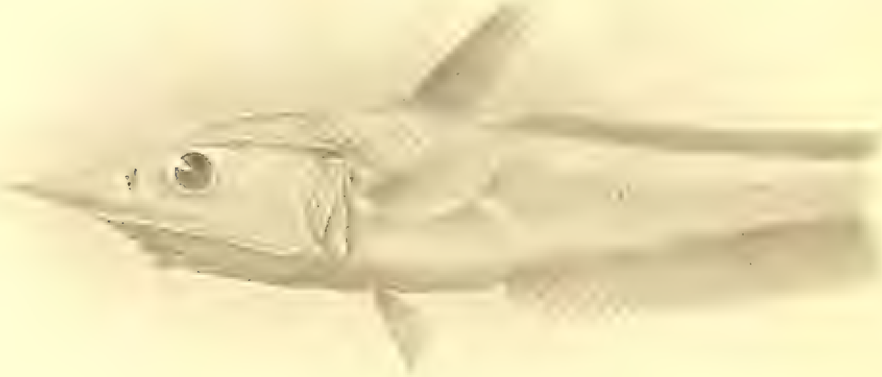


FIG. 264.—*Cœlorhynchus aratrum* Gilbert, new species. Type.

preoral portion of snout, without terminal spine; teeth minute, in wide bands in each jaw, none of them at all enlarged; barbel half as long as diameter of pupil; near tip of snout, on lower side, a small patch of prickles, similar to those covering infraorbital ridge, and like them adnate to the bone; with this exception all the region below infraorbital ridge, including mandibles, is smooth, without scales, prickles, or tubercles (in *C. parallelus* all of this region, except gular and branchial membranes, is thickly beset with irregular small plates, each bearing from 1 to 3 spines); where the gill-membranes are joined across throat they form a narrow free fold; gill-rakers represented by small tubercles, 7 or 8 in number on outer arch.

First dorsal fin inserted well behind axil of pectorals; predorsal region invested with scales similar to those of sides, arranged in regular series, and scarcely reduced in size; second dorsal spine smooth throughout, very slender and weak, its terminal portion as flexible as the rays; length of dorsal spine equal to that of snout; distance between dorsals equal to base of first dorsal exclusive of the 2 spines; anal originating a trifle behind front of second dorsal; anal opening immediately before origin of anal fin, its distance from inner base of ventrals a trifle less than the distance from latter to margin of the gill-membranes on median line; this measurement remains almost constant in specimens of very different size. In a specimen of *C. parallelus* from Misaki, Japan, and in Günther's figure (Kermadec Islands) the distance from base of ventrals to vent is much greater than between ventrals and edge of gill-membrane. In *C. aratrum*, the ventral filament reaches vent.

Scales of back and sides each with 6 to 15 strong spines arranged in 3 to 5 nearly parallel series. The spines stand out at an angle of 45°, those of the central series somewhat larger than those of the lateral rows, and the spines in each row increasing rapidly to the posterior one, which projects well beyond margin of scale in both median and lateral series; the spines are longer and slenderer than in a specimen of *C. parallelus* from Japan, and there is less inequality between central and lateral series; on breast, the scales have 3 to 5 short, strongly radiating series of spines, the spines shorter than those on sides; scales of lateral line have 2 equal series of spines, separated by the tube, and have fewer lateral series, or none; on head, the spines are more numerous and much slenderer, and project nearly at right angles to the surface, giving a characteristic hispid appearance to the entire top and side of head; they are arranged with less regularity, but usually in strongly diverging or stellate series; they are much more numerous than in *parallelus*, and have all the series equal or nearly so; 5 series of scales between lateral line and dorsal fins; the series running upward and backward from first scale of lateral line runs to base of dorsal spine; 4 series cross the back between dorsal fins.

Color, light brown above, whitish on lower side of snout and below pectoral fin; mouth and gill cavities and abdominal cavity lined with blue-black, this color faintly visible through opercle, gill-membrane, and abdomen; first dorsal black at base, bright white distally; pectorals, second dorsal, and anal dusky or whitish; ventrals dusky at base, then white.

Taken at stations Nos. 3910, off the south coast of Oahu, 311 to 337 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms, and 4088, Pailolo Channel, 297 to 306 fathoms.

Cœlorhynchus parallelus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 421; not of Günther.

Cœlorhynchus doryssus, new species. Plate 94.

Type, 345 mm. long, at station 4109, Kaiwi Channel, depth 442 to 449 fathoms; type, No. 51616, U. S. Nat. Mus.

Similar to *C. aratrum*, but with the snout more slender and more convex; the mouth much larger, the scales on head minutely spinous, those on body much less strongly spinous, and the coloration much lighter.

Depth of body 2.2 in length of head; D. II, 7, last ray cleft to base; V. 7; P. 17.

Lateral contour of head forming a nearly straight line, the outlines of the long narrow snout scarcely at all convex, converging regularly from base to tip; upper profile of snout longitudinally concave, the deepest point in the concavity being at origin of the second third of its length; width of snout opposite front of orbits contained 1.4 in its length; at its middle, the width of the snout is half its preoral portion; the snout ends in a definite short spine; vertical diameter of orbit contained 1.6 times in its longitudinal diameter, which equals the convex interorbital width, and is contained twice in snout; upper margin of orbit much less curved than the lower or lateral margins; the pore-like anterior nostril is but a fourth the vertical length of the posterior, the 2 nostrils separated by a black membrane; ridges on head low but distinct, the inner pair on occiput converging posteriorly, then again slightly diverging. Median rostral ridge inconspicuous; the strong infraorbital ridge ends posteriorly in a short strong spine, beyond which projects the soft membranous margin of the preopercular lobe; upper limb of preopercle gently concave in its lower half, gently convex in the upper; transverse width of mouth at tips of maxillaries equal to 0.6 width of snout at same level; front of mouth opposite anterior nostril; tip of maxillary reaching a point opposite posterior margin of pupil; length of maxillary 0.7 preoral portion of snout; teeth small, in wide bands in each jaw, none of them enlarged; barbel very slender, half diameter of pupil; gill-membranes forming a very narrow free fold across throat; 9 tubercles represent gill-rakers on outer arch.

First dorsal fin inserted directly above axil of pectoral; second dorsal spine smooth throughout and very slender and weak, the distal half as flexible as a ray, its length equaling 0.7 that of snout; the distance between dorsals equals base of anterior dorsal without its spines, and is crossed by 3 series of scales; anal originating under second or third ray of second dorsal; inner base of ventrals midway between vent and edge of branchial membrane on median line; ventral filament reaching vent; pectorals reach to a point opposite origin of anal fin.

Scales of back and sides each with a median ridge composed of imbricating spines, which increase regularly in length posteriorly, the last one projecting little if at all beyond margin of scale; also from 1 to 6 pairs of similar but very low parallel lateral ridges, which never approximate in size to the central ridge, and rarely reach margin of scales; spination much weaker than in *parallelus* or *aratrum;* on breast and abdominal regions, the lateral series are much stronger than on back and sides, and are still parallel or nearly so; scales on head without spines, but roughened with minute prickles, which are arranged in more or less evident radiating or stellate series; a naked area is evident on middle of occiput, where the scales fail to meet; naked lines also follow along the ridges, and between nasal bones and rostral ridge; nasal fossa nearly as large as pupil; lower side of head wholly naked, except for a small patch of prickles near tip of snout; 5 series of scales between lateral line and second dorsal fin; 13 scales in a series upward and backward from vent to lateral line.

Color very light gray, all the fins, including ventral filament, black throughout; terminal portion of snout and lower side of head blackish; lining of mouth, gill-cavity, and peritoneum black, very faintly visible externally.

In young specimens, 125 mm. long and less, apparently belonging to this species, the scales on back and sides are essentially similar to those in adults, both median and lateral series of spines being present, and in about the same relative size. The cephalic ridges seem proportionally higher and are strongly spinous, including a median rostral ridge which loses its prominence in adults; but the intervening areas on head, as well as the breast and belly, are covered with smooth cycloid scales, a few only showing a series of median spines. Specimens less than 100 mm. long are marked by a series of 10 to 15 small black spots along base of anal fin.

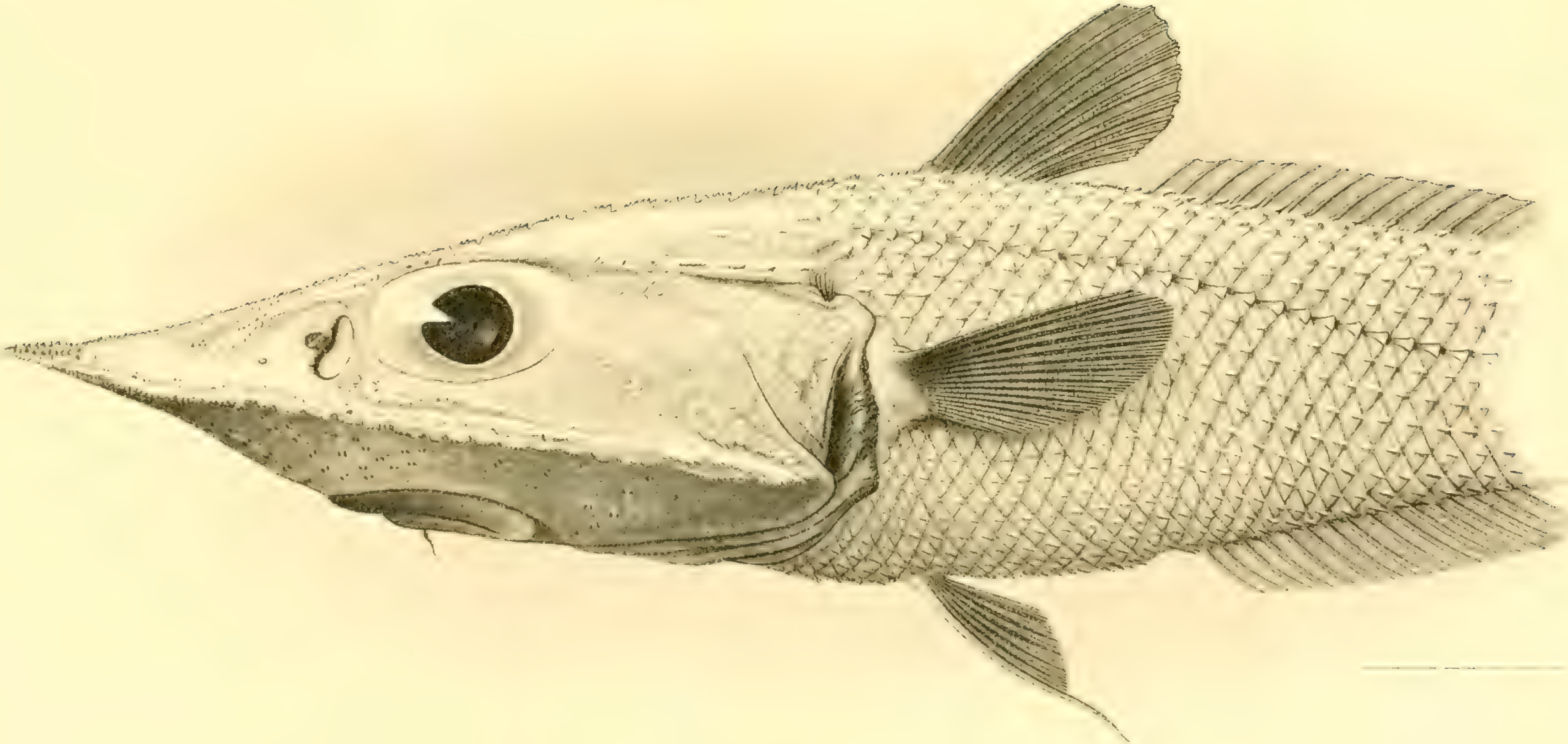
Taken at the following stations: Nos. 4021, off the east coast of Kauai, 286 to 399 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms.

Matæocephalus acipenserinus (Gilbert & Cramer).

A very abundant species at depths between 200 and 400 fathoms. The following details may be added to the original description of the species.

Lateral margins of head angulated at a point immediately in front of nostrils, in front of which the contours converge much more rapidly. In this anterior segment of the snout, the lateral margin is soft and membranous, with skeletal basis, but is thickened and covered with comparatively large spinous scales; suborbital bone weakly spinulose; as it fails to join preopercle behind, it is less firmly fixed than usual; occipital region evenly rounded, without trace of the spinous ridges so conspicuous in species of *Cœlorhynchus*. Mouth very small, the width posteriorly but 0.3 the width of head on same line.

Two types of coloration appear in our specimens. Some are uniform pale brown on upper parts, as in the type, others have a pale spot at base of each scale forming rather definite longitudinal streaks above lateral line. In these specimens, the top of head and the first dorsal fin are spotted or mottled with dark.



CŒLORHYNCHUS DORYSSUS GILBERT. TYPE.

JULIUS BIEN & CO. LITH.

The largest specimen obtained is 200 mm. long.

Taken at the following stations: Nos. 3824, off the south coast of Molokai, 222 to 498 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3979, off Bird Island, 222 to 387 fathoms; 4014, off the east coast of Kauai, 362 to 399 fathoms; 4015, off the east coast of Kauai, 318 to 362 fathoms; 4021, off the east coast of Kauai, 286 to 399 fathoms; 4025, off the east coast of Kauai, 275 to 368 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4091, approach to Pailolo Channel, 306 to 308 fathoms.

Calocephalus acipenserinus Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 422, pl. XLII, fig. 1.

Malacocephalus hawaiiensis, new species. Fig. 265.

Type, 36 cm. long, from station 3907, off south coast of Oahu, depth 304 to 315 fathoms; type, No. 51618, U. S. Nat. Mus.

Depth at origin of first dorsal 1.2 in length of head; D. II, 11 or 12; V. 9; P. 19 or 20.

This species was secured in the Kaiwi Channel by the *Albatross* in 1891, and was taken in some abundance during the summer of 1902. It has been identified by Gilbert and Cramer with *M. lævis*, from the Atlantic, and is undoubtedly closely related to that species. There has been no opportunity to make direct comparison of specimens, but as Hawaiian specimens in certain important respects fail to answer the current descriptions of *M. lævis*, it seems advisable to distinguish them from that species. The descriptions of *M. lævis* are lacking in detail, and other distinctive characters may appear when specimens are directly compared. Two specimens captured by the *Investigator* in the Andaman Sea have been identified by Alcock with *M. lævis*, without further remarks.

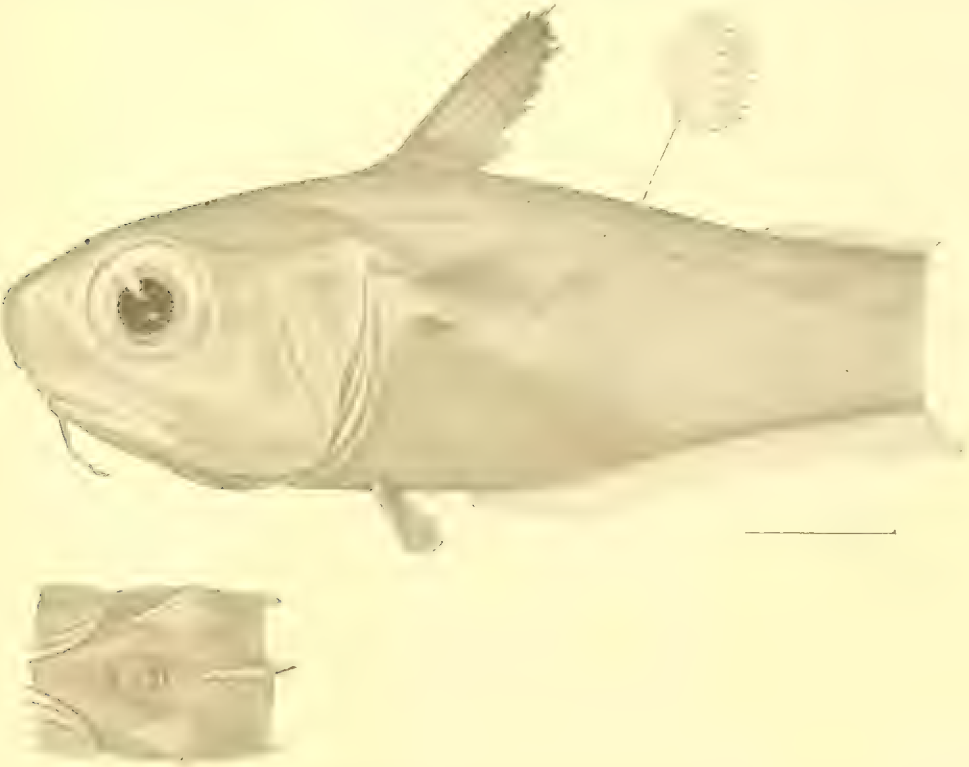


FIG. 265.—*Malacocephalus hawaiiensis* Gilbert, new species. Type.

Snout high and compressed, protruding beyond mouth for an axial distance nearly equaling half orbital diameter; anterior profile of snout very oblique; distance from its tip to premaxillaries contained 4.7 in length of head; length of snout 0.8 longest orbital diameter, and contained 3.5 times in length of head; interorbital space convex, with somewhat depressed central area, its width 0.3 length of head; longest orbital diameter very slightly more than 0.3 length of head; nasal fossa scaled in its posterior half, the longitudinal diameter of naked portion half that of pupil; length of the posterior nostril 0.4 pupil; top and sides of head without conspicuous ridges; greatest width of mouth, measured externally, contained 1.8 times in its greatest length; maxillary reaching a vertical which intersects orbit halfway between pupil and hinder margin of orbit, its length contained 2 or 2.1 times in length of head; premaxillary teeth in a double series, the outer of moderate canines, which decrease in size laterally, the inner of much smaller curved teeth directed backward; mandibular teeth uniserial, except at symphysis, where 2 teeth on either side stand behind 2 of the outer row; anterior teeth about equal to those to which they are opposed in upper jaw; lateral teeth increasing in size backward, and becoming the largest in the mouth; barbel half or slightly more than half orbital diameter; preopercular angle broadly produced backward, the posterior margin very oblique and incurved; above opercle, a wide band of scales covers scapular region, separated from neighboring scaly areas above and below by narrow naked lines; gill-membranes rather narrowly joined across isthmus, forming a fold which is entirely free; anterior gill-slit less constricted than usual, its width 3 times that of slit behind fourth gill; gill-rakers 7 in number, tubercular, but unusually prominent, slightly movable, and bearing long spinous teeth; no exposed spines in connection with opercles or shoulder-girdle.

Second dorsal spine very slender and weak, not extending beyond the tip of the following ray and not filamentous, its length 1.6 times in head, very slightly exceeding length of snout and eye; second dorsal very low, but perfectly distinct throughout its course, its first ray about over thirtieth anal ray; interspace between dorsals unusually long, equaling about 2.5 times the base of anterior fin; length of interspace is not described or figured in *M. lævis*, in which the second dorsal is said to be so low and indistinct as to render uncertain the point of origin; anal fin low, its origin vertically under third ray of first dorsal; distance from anal opening to point where edge of branchiostegal membrane crosses isthmus half length of head. In *M. lævis* Günther finds the "distance between the vent and isthmus two-thirds of the length of the head." Pectorals shorter than in *M. lævis*, half length of head, and containing constantly 19 or 20 rays, instead of 17 or 18, as in that species; outer ventral ray produced, reaching base of tenth or twelfth anal ray.

In *M. hawaiiensis*, as in *M. lævis*, there is a deep, scaleless, transversely elliptical pit between bases of ventral fins, but in the Hawaiian species the pit is smaller. The anus is equidistant from the base of ventrals and the first anal ray, or slightly nearer anal, and lies at the posterior end of a longitudinally oblong or wedge-shaped naked area, which is separated from the anterior pit by a narrow band of scales. There is no trace of a constriction dividing anal area into a posterior linear portion containing anus and an anterior oblong portion, as is figured by Günther in *M. lævis*. The descriptions by Günther and by Lütken do not, however, agree with the interpretation of the artist. Lütken describes the position of the anal opening in *M. lævis* as beneath the fourth ray of the first dorsal, and behind base of pectorals. In *hawaiiensis* a vertical from the anus traverses the pectoral base and the base of second dorsal spine.

The scales are very small, high and narrow, caducous, those on posterior part of body lost in all specimens which we have obtained; under anterior dorsal, each scale is densely covered with short spines which show no evident arrangement; scales on nape and breast similar; on top of head the spines are similar, but frequently arranged in parallel or diverging lines; no arrangement is apparent on sides of head; head very completely scaled; lips and half the nasal fossæ naked; gular membrane with spinous plates on median line only, and those on gill-membranes confined to single series accompanying rays; with these exceptions all exposed surfaces of head are densely covered; the lateral line describes a long convex curve anteriorly, and reaches middle of sides more than a head's length behind its origin.

Color olive-brown above, bluish silvery on sides of head and trunk; gill-membranes and abdomen black; mouth cavity white, gill-chamber black, except the part overlying the epihyal and ceratohyal; abdominal cavity lined with black; first dorsal, ventrals, pectorals, and anterior portions of dorsal and anal fins black.

The pyloric cæca branch profusely from a few trunk-like stems, there being about 200 terminal twigs. The stomachs contain fragments of shrimp-like crustacea and numerous eyes and jaws of squid. The latter are almost universally present, and indicate that squid form a very important element in their food.

Specimens were taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3868, Pailolo Channel, 294 to 684 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 3979, near Bird Island, 222 to 387 fathoms; 3988, near Kauai, 165 to 469 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4087, Pailolo Channel, 306 to 308 fathoms; 4088, Pailolo Channel, 297 to 306 fathoms; 4089, Pailolo Channel, 297 to 304 fathoms; 4090, Pailolo Channel, 304 to 308 fathoms; 4096, Pailolo Channel, 272 to 286 fathoms; 4097, Pailolo Channel, 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4130, near Kauai, 283 to 309 fathoms; 4134, near Kauai, 225 to 334 fathoms.

Malacocephalus lævis Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 432; not of Lowe.

Trachonurus sentipellis Gilbert & Cramer.

This is one of the rarer species of the group, but 14 specimens having been obtained, distributed among 10 dredge-hauls.

The margins of the scales appear distinct owing to the absence of spines around the edge, but the scales are firmly embedded, without free margins, and overlap little if at all. The spines on the anterior scales appear for the most part without definite arrangement; there are sometimes, however, one angulated vertical series near anterior margin of scale, and a median longitudinal series; lateral spines frequently fill up the interspace between these, forming thus a lozenge-shaped patch. Posteriorly where the spines are long and appressed they give an evenly villous appearance to sides of tail.

Head with contours everywhere rounded, without ridges or sharp angles; mouth barely overpassed laterally by the wide flat suborbitals, its width nearly equal to its length; narrow villiform bands of teeth in each jaw, the outer series in the upper jaw little if at all enlarged; gill-membranes widely joined at throat and wholly free from isthmus; six or seven scales between lateral line and base of anterior portion of second dorsal; length of base of first dorsal contained from 1 to 1.75 times in interspace between dorsals; all but the innermost ventral rays reach beyond origin of anal fin; distance from axil of ventrals to front of anal contained 2.25 to 2.75 times in distance from axil of ventrals to throat. Some young specimens are uniformly black. There are variations in the contour of the snout, which is sharper and narrower in some specimens than in others. The scales vary in length of spines and in distinctness of outline.

The species was taken at the following stations: Nos. 3997, vicinity of Kauai, 418 to 429 fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4028, vicinity of Kauai, 444 to 478 fathoms; 4030, vicinity of Kauai, 423 to 438 fathoms; 4106, Kaiwi Channel, 335 to 350 fathoms; 4107, Kaiwi Channel, 350 to 355 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4113, Kaiwi Channel, 395 to 433 fathoms.

Trachonurus sentipellis Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 429, pl. XLV, fig. 1.

Family PLEURONECTIDÆ.

Pœcilopsetta hawaiiensis, new species. Plate 95.

Type, a male, 126 mm. long, from station 3858, Pailolo Channel between Molokai and Maui, depth 128 to 138 fathoms; type, No. 51638, U. S. Nat. Mus.

Head 24 hundredths in total length without caudal (27 in female cotype); length of snout, from lower eye 3, from upper eye 6 (3.5 and 7 in female); interorbital width 2 (1.5 in female); diameter of upper eye 7.5; length of maxillary 7; depth of body 54; depth of caudal peduncle 13; longest dorsal ray 11; longest caudal ray 25; length of right pectoral 17; left pectoral 11; chord of arch of lateral line 22. D. 65; A. 54; P. 10; lateral line 85.

Body dextral, deeply elliptical, very thin, transparent at bases of dorsal and anal fins; upper and lower profiles evenly and equally arched; head small; interorbital space narrow and scaled; eyes large, even, the upper encroaching on the profile; head without spines or tubercles; mouth small, oblique, with equal jaws; length of maxillary less than 0.3 length of head; teeth slender, villiform, arranged in wide bands in jaws; more numerous on blind side, where the bands are wider and longer; on eyed side, the bands taper rapidly, becoming single series in upper jaw, soon disappearing in lower jaw; vomer and palatines toothless; gill-rakers very short, toothless, developed on both vertical and horizontal limbs of arch, 8 + 12 in number.

Dorsal fin beginning above middle of upper eye, extending, like the anal fin, to base of outer caudal rays; dorsal and anal rays all simple, scaleless, low, none of them prolonged; caudal double-truncate; the right pectoral longer than the left, its rays densely covered with series of scales; ventrals nearly symmetrical, with narrow bases, the right slightly in advance of the left.

Scales rough-ctenoid on the right side, smooth and cycloid on the left; lateral line developed on right side only, with a high anterior arch, which is obliquely truncate above, its upper line nearly straight and rising posteriorly.

Color in spirits, light-olive-brown, with very fine brown spots and some faint dark spots and bars, the spots apparently arranged in a series just within upper and lower outlines, the bars apparently 4 in number, with ill-defined edges, narrower than interspaces; a series of brown blotches on basal portion of dorsal and anal fins; right pectoral narrowly black-edged; caudal with a pair of large black spots occupying middle of outer rays.

In 6 specimens, which do not include the type, the following fin and scale counts are observed: Dorsal 62, 64, 65, 65, 66, and 67; anal 53, 57, 55, 56, 58, and 58; pectoral 9, 10, 12, 11, 10, and 9; scales 85, 84, 97, 84, 84, and 90.

The species was taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 3957, near Laysan, 173 to 220 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4080, off the north coast of Maui, 178 to 202 fathoms; 4081, off the north coast of Maui, 202 to 220 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4120, off the northwest coast of Oahu, 167 to 216 fathoms.

Tæniopsetta, new genus.

Body sinistral; ventral fins lateral in position, nearly symmetrical; mouth small, teeth small, conical, equally developed on both sides, in single series; scales minute, strongly ciliated in the typical species; a strong anterior arch to lateral line; no lateral line on blind side; a narrow sharp interocular ridge in both sexes; some of anterior dorsal and anal rays prolonged and filamentous.

In addition to the typical species, the genus may include *Pseudorhombus ocellatus* Günther (Shore-fishes, Challenger, 1880, p. 56, pl. XXIV, figs. A and B), from the Admiralty Islands, although in this species the scales are said to be not ciliated.

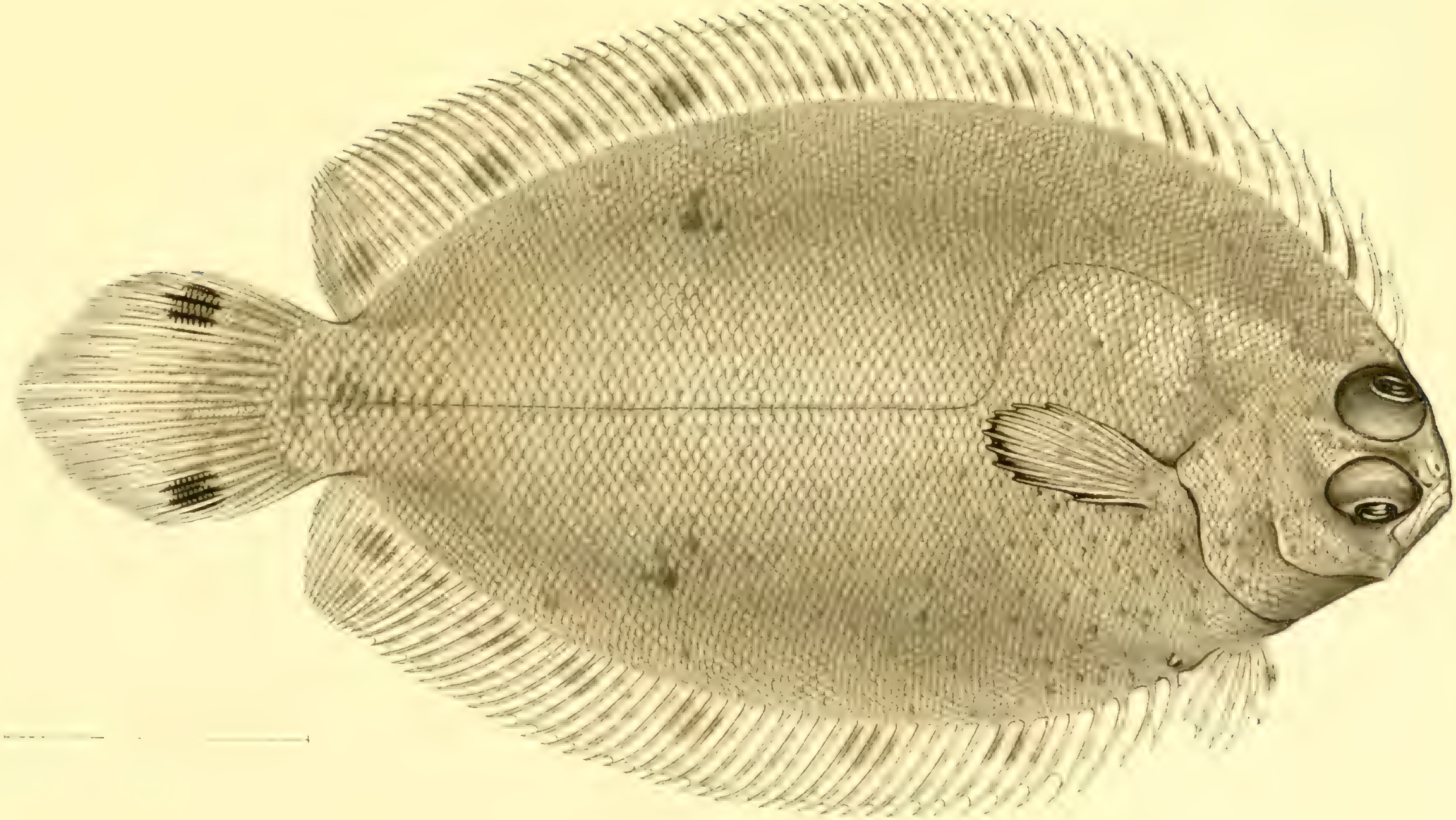
Tæniopsetta Gilbert, new genus of *Pleuronectidæ* (*radula*).

Tæniopsetta radula, new species. Fig. 266.

Type, a male, 115 mm. long, from station 3858, Pailolo Channel between Molokai and Maui, depth 128 to 138 fathoms; type, No. 51639, U. S. Nat. Mus.

Length of head 26 hundredths of total length without caudal; length of snout from lower eye 5.5, from upper eye 9; diameter of upper eye 9; length of maxillary 7.5; depth of body 62; least depth of caudal peduncle 10; longest dorsal ray 43 (27 in female cotype); longest anal ray 45 (30 in female); longest non-filamentous dorsal ray 13; longest caudal ray 22; longest pectoral ray 16; chord of arch of lateral line 15. D. 88; A. 72; P. 13; pores in lateral lines about 110; rows of scales running upward and forward above lateral line about 140. Vertebræ 9 + 31.

Body deeply ovate; ventral outline more arched than dorsal; snout very short, its anterior profile nearly vertical, very slightly incurved opposite origin of dorsal fin; eyes large, separated by a sharp scaleless ridge, which bears a series of spinous prickles, more or less numerous in both sexes; one or more spines also present on the anterior rim of each orbit, one above premaxillaries, and one at symphysis of lower jaw; lower eye but little in advance of upper; mouth very small, oblique, maxillary not nearly reaching vertical from front of pupil, about .3 length of head; teeth close-set, conical, equal, in a single series, with a few declined teeth forming an inner series in left premaxillary near angle of mouth; vomer and palate toothless; gill-rakers nearly obsolete, but 5 very short rudiments on horizontal limb of arch.



Pœcilopsetta hawaiiensis Gilbert. Type.

Julius Bien & Co. Lith. N.Y.

First dorsal ray inserted on middle of snout, slightly to right of ridge, bordered by a wide conspicuous membranous flap, the distal portion of which, on blind side, is intensely black, bordered narrowly with white; dorsal rays increasing regularly in length with wide free tips to the twelfth, those from the twelfth to the eighteenth greatly produced and filamentous, all but a narrow basal portion free from membrane; first 4 anal rays similarly produced and filamentous, the first much shorter than the others; a jet-black spot margined with white on membrane of first 3 anal rays; caudal fin lanceolate; no free caudal peduncle; right pectoral fin $\frac{2}{3}$ left; ventral fins symmetrical, opposite and of equal length, a very strong concealed spine between them.

Scales very minute, those on left side firm, closely imbricated, strongly ciliated; those on right side more loosely imbricated, with entire edges; rays of dorsal and anal fins on the left side, and the left ventral rays each accompanied by a row of ctenoid scales; caudal rays with 2 such series; filamentous rays scaled on basal portions only; pectoral fins and right ventral scaleless; snout and mouth parts naked; anterior arch of lateral line rather low and flat-topped.

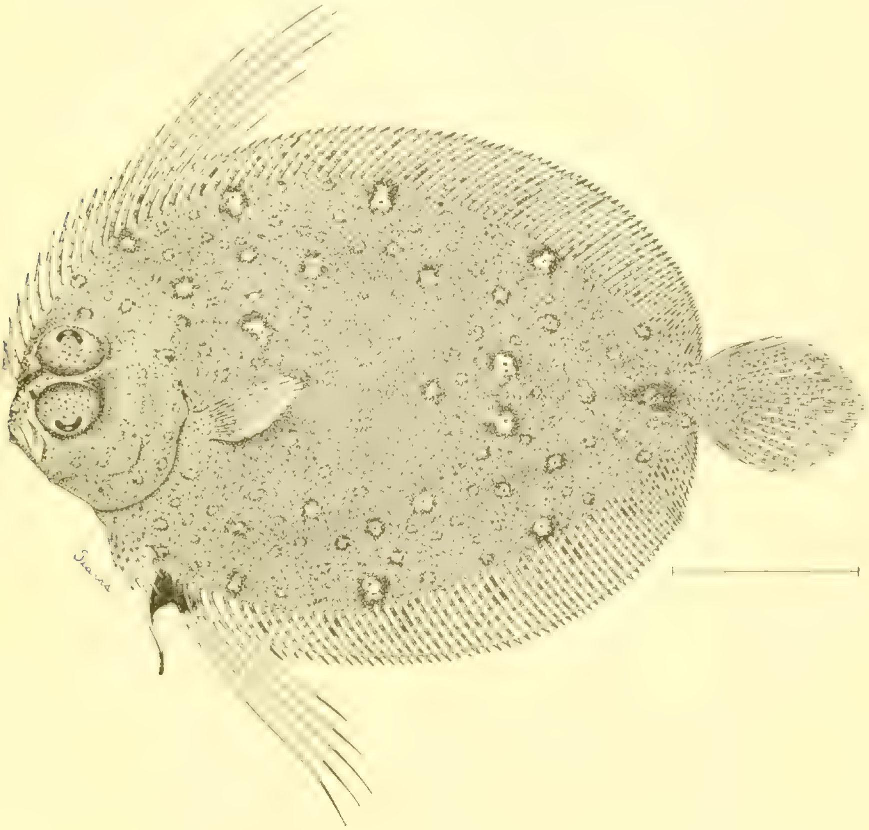


FIG. 266.—*Tæniopsetta radula* Gilbert, new species. Type.

Color light olive-brown, finely mottled and specked with darker brown; a series of brown rings along dorsal and ventral outlines, with other smaller rings scattered between these and lateral line; two pairs of rings along straight portion of lateral line with their margins frequently produced across the line, the posterior pair more conspicuous than the anterior; an elongate dark spot near base of caudal; in males a dark streak in front of lower margin of upper eye; blind side faintly mottled with dusky, posteriorly.

Females differ from males in having the orbital region somewhat less spinous, in the larger eye, and in the shorter filamentous rays of dorsal and anal. In females the tenth to thirteenth or fourteenth dorsal rays and the first to third or fourth anal rays are produced; in males the tenth or twelfth to fifteenth or eighteenth dorsal rays and first 4 or 5 anal rays. In *T. ocellatus* the rays are not elongate in females.

In 5 specimens, among which this type is not included, the fin and scale counts are as follows: Dorsal 88, 89, 90, 92, and 93; anal 72, 72, 73, 75, and 75; pectoral 12, 12, 13, 12, and 12; pores in lateral line –, 120, 120, 115, and –.

Taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3853, off the south coast of Molokai, 115 to 134 fathoms; 3857, Pailolo Channel, 127 to 128 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3957, Laysan, 173 to 220 fathoms; 4077, off the north coast of Maui, 99 to 106 fathoms; 4099, off the north coast of Maui, 152 to 153 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

Samariscus, new genus.

Like *Samaris*, but the anterior dorsal and ventral rays not greatly produced and filamentous as in that genus; scales on blind side strongly ciliated instead of smooth; integument of eyed side, including head, body, and fins, thickly beset with minute cup-shaped organs, possibly glandular in function; eyes dextral; ventrals symmetrical, laterally inserted, with 5 rays; mouth rather small; teeth in villiform bands; lateral line rising anteriorly, but without arch, present on eyed side only; scales very small, strongly ciliated on both sides; gill-openings contracted, opercle becoming adnate shortly above base of pectoral; gill-rakers nearly obsolete; right pectoral with 4 rays; left pectoral wanting; fins all scaleless, except caudal.

Samaricus Gilbert, new genus of *Pleuronectidæ* (*corallinus*).

Samariscus corallinus, new species. Plate 96.

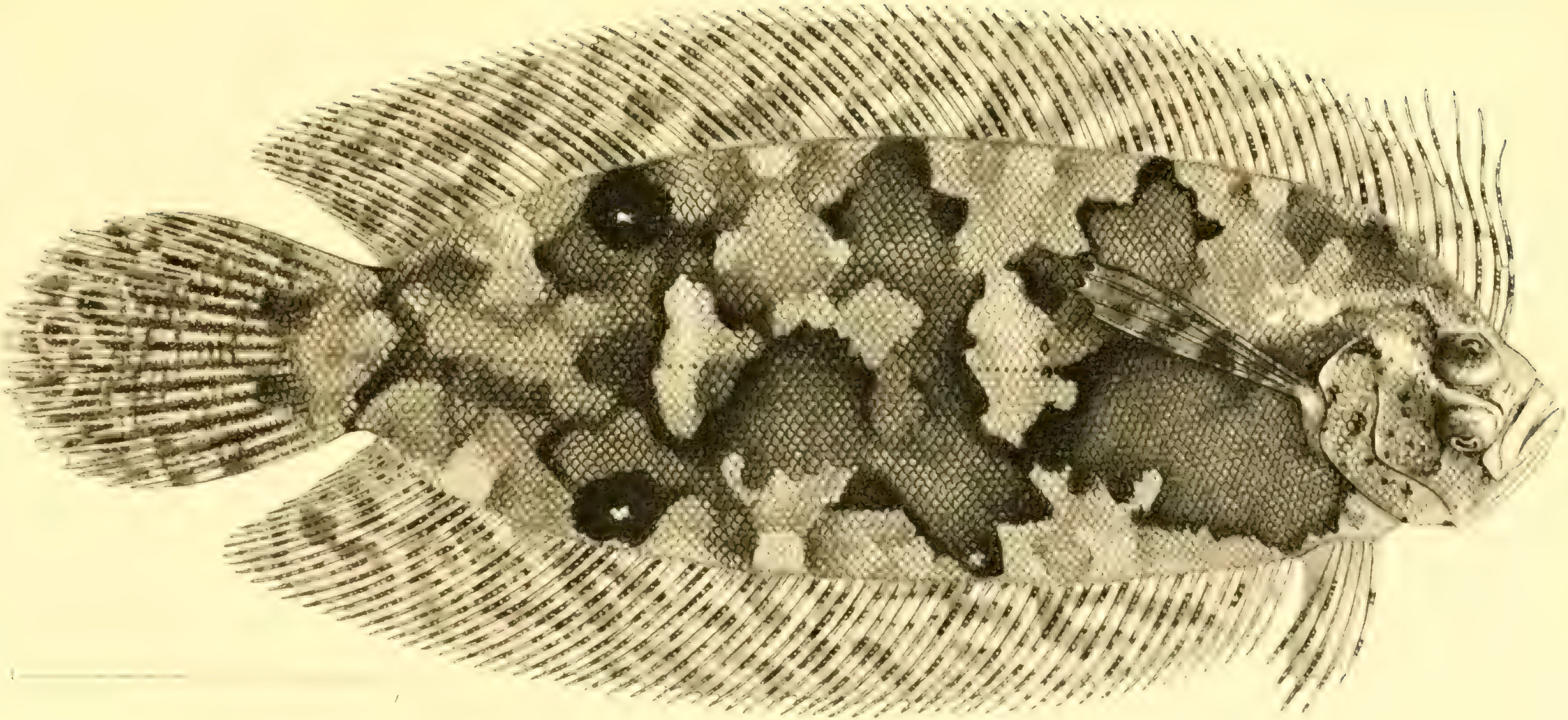
Type, a male, 110 mm. long, from station 3849, off south coast of Molokai, depth 43 to 73 fathoms; type, No. 51596, U. S. Nat. Mus.

Length of head 21 hundreds of total length without caudal; length of snout, from lower eye 5, from upper eye 6; diameter of upper eye 4; interorbital width 2; length of maxillary 8.5; depth of body 37; least depth of caudal peduncle 14; length of second dorsal ray 18; length of middle dorsal rays 15; length of posterior dorsal rays 18; length of pectoral 19; length of right ventral 17; length of caudal 28. D. 76; A. 65; P 4.; V. 5; pores in lateral line 98.

Long and slender, with nearly parallel outlines; caudal peduncle deep; head very small; mouth very oblique, with strongly protruding lower jaw; maxillary extending below front of pupil; teeth very fine, in bands in both the jaws, the bands wider on blind side; vomer and palatines toothless; anterior profile indented above and in front of upper eye, which is placed slightly behind the lower; interorbital space occupied by a blunt ridge, and completely scaled; preopercular margin free; opercle becoming adnate immediately above base of pectoral fin; gill-laminæ very scanty, the arches short; a slit behind last arch; gill-rakers nearly obsolete, represented by 2 or 3 rudiments only.

Dorsal fin beginning above front of upper eye; first ray inserted slightly to the blind side of ridge, its anterior membrane extending a short distance downward across snout; first 5 or 6 dorsal rays a little higher than those which follow, and extensively free; both dorsal and anal fins increasing in height toward tail, some of posterior rays extending to opposite middle of caudal fin; caudal lanceolate, from a broad base; ventrals symmetrical, composed of 5 rays each; right ventral much longer than left, but without free or filamentous rays; right pectoral very narrow, containing but 4 rays. Scales very strongly ciliated and closely imbricated on the right side, less imbricated and less spinous on the left.

Color in spirits, snout and lower jaw pinkish white; head and body coralline-red, mottled and spotted with blackish, pearly gray, and pinkish white in indescribable pattern; middle of side with 2 large cross blotches, their upper half pearly gray, their lower half pinkish, irregularly dark margined; a similar smaller spot at base of caudal, dark margined anteriorly; two round black spots with small orange center near outlines of body at origin of last third of total length; near dorsal outline, in advance of the round spot, are 2 Λ-shaped dark markings with apex toward the fin; a similar V-shaped spot near lower outline; fins mottled and spotted with colors like those of body, but in finer pattern;



SAMARISCUS CORALLINUS GILBERT. TYPE.

minute white "glandular" organs conspicuous, covering eyes and all fins as well as head and trunk, but absent on blind side.

In 3 cotypes from the same locality, the fin and scale counts are as follows: Dorsal 75, 76, and 77; anal 63, 63, and 63; pectoral 4, 4, and 4; ventral 5, 5, and 5; scales in lateral line 100, 99, and 99.

Anticitharus debilis, new species. Plate 97.

Type, a female, 173 mm. long, from station 4103, Pailolo Channel, between Molokai and Maui, depth 132 to 141 fathoms; type, No. 51657, U. S. Nat. Mus.

Closely related to *A. polyspilus* Günther (Shore-fishes, Challenger, p. 48, pl. 22, fig. A) from the Ki Islands, differing in the longer dorsal and anal fins, the much smaller scales, and the shorter anterior curve in lateral line.

Length of head 26 hundredths of total length without caudal; length of snout from upper orbit 7.5, from lower orbit 5.5; horizontal diameter of upper eye 7; length of maxillary 10; greatest depth 37; depth of caudal peduncle 8; longest dorsal ray 10; longest anal ray 10; longest caudal ray 17; longest pectoral ray, on left side 12, on right side 4.5; chord of curve of lateral line 12. D. 112; A. 91; P. 13; scales in lateral line 95.

Body slender, thin, and fragile, semitransparent, with deciduous smooth scales, and fragile fin rays; anterior profile of snout deeply incurved in advance of upper eye, the terminal portion of snout protruding hook-like beyond it; mouth rather large, oblique, the maxillary 0.4 length of head, reaching a point behind front of pupil; lower jaw much shorter than upper; anterior premaxillary teeth wholly outside mandibular symphysis in closed mouth; teeth in single series; all those in lower jaw and the anterior teeth of upper jaw are widely spaced moderate canines; lateral teeth in upper jaw much smaller and more closely set; vomer and palatines toothless; eyes separated in females by a very narrow bony septum, which is minutely channeled longitudinally, this accompanied by a single series of narrow scales, or the series may be interrupted over middle of lower eye; males can be at once detected by the slightly wider and more evidently grooved interorbital space, the width of which over middle of eye is about 0.3 diameter of pupil; in males, the interorbital space is scaled throughout; the vertical from the front of upper eye traverses lower eye a little in advance of pupil; no spines or tubercles on head in either sex; gill-rakers short, slender, toothed; the longest half diameter of pupil; 10 gill-rakers on horizontal limb of outer arch, none being developed on vertical limb.

Dorsal fin beginning on blind side of snout immediately behind nostril; the rays regularly graduated from the first to the longest, which is slightly behind middle of fin, none of them produced; throughout the dorsal fin the membrane extends nearly to tips of rays, leaving only extreme tips free; anal fin wholly similar; left ventral with an elongate base and inserted on ridge of abdomen, its posterior membranes slightly deflected to the left, its attachment lying immediately at left side of base of first anal ray; caudal wedge-shaped, or double truncate with a rounded tip; right pectoral much smaller than left, but with an equal number of rays.

Scales cycloid on both sides, and caducous; terminal portion of snout naked, rest of head scaly; each dorsal and anal ray accompanied by a single series of scales; caudal rays alone forked, carrying several series of scales; pectorals and ventrals naked; anterior arch of lateral line flat-topped, its chord contained 5.7 times in straight portion; no lateral line on blind side.

Coloration: Light olive-brown, finely freckled with darker brown and sparsely spotted with light, the spots irregular in outline, each surrounded by a darker ring; spots principally distributed on head and near outlines of body; two spots on lateral line, one near middle of its length, accompanied with a large dark spot; vertical fin rays finely mottled, with oblong dark blotches at intervals of 10 to 15 rays.

In 5 specimens, which do not include the type, the fin rays and scales are as follows: Dorsal 114, 114, 116, 116, and 117; anal 90, 92, 96, 92, and 95; pectoral 13, 15, 13, 14, and 14; scales in lateral line 97, 94, 98, 96, and ——.

The genus *Anticitharus* is most nearly allied to *Arnoglossus*, from which it differs principally in the very fine scales.

Taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 3958, near Laysan Island, 173 to 182 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

Platophrys mancus (Broussonet).

In addition to the specimens of this common species which were seen almost daily in the Honolulu market, others were dredged at depths of less than 75 fathoms. At station 3859, very young specimens were taken which were entirely transparent, and were very probably captured at or near the surface. Young individuals were often secured in the surface tow-nets.

Specimens were taken at the following stations: Nos. 3859, Pailolo Channel, 138 to 140 fathoms; 3875, between Maui and Lanai, 34 to 65 fathoms; 3940, vicinity of Laysan, 59 to 70 fathoms; 4070, off the north coast of Maui, 45 to 52 fathoms.

Platophrys chlorospilus, new species. Fig. 267.

Type, a male, 183 mm. long, from station 4074, off north coast of Maui, depth 78 to 85 fathoms; type, No. 51647, U. S. Nat. Mus.

Length of head 26.5 hundredths of total length without caudal; longest diameter of orbit 8.5; least interorbital width 6; length of snout, from lower eye 6, from upper eye 14; length of maxillary 10; depth of head across middle of upper eye 30; greatest depth of body 45; depth of caudal peduncle 10; length of left pectoral 21; chord of arch of lateral line 16. D. 108; A. 89; P. 13; scales in lateral line 90.

Body rather slender, eyes proportionately large and widely separated; profile slightly angulated in front of upper eye; mouth oblique; maxillary extending to below front of pupil; teeth in single series in both jaws; lateral premaxillary teeth small and close-set; anterior premaxillary and mandibular teeth larger and more widely spaced; no teeth on vomer or palatines; interorbital space a wide shallow groove, its width less than the diameter of the large eye; no spines or protuberances about eyes or on snout; gill-rakers slender, toothless, 9 in number, the longest 0.3 diameter of pupil, wholly wanting on vertical limb of arch; slit behind last gill short, 0.3 diameter of eye.

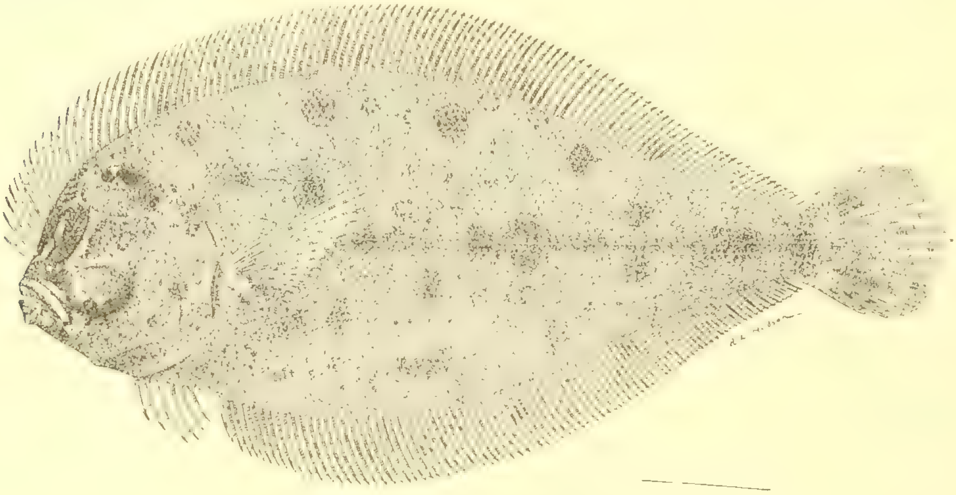
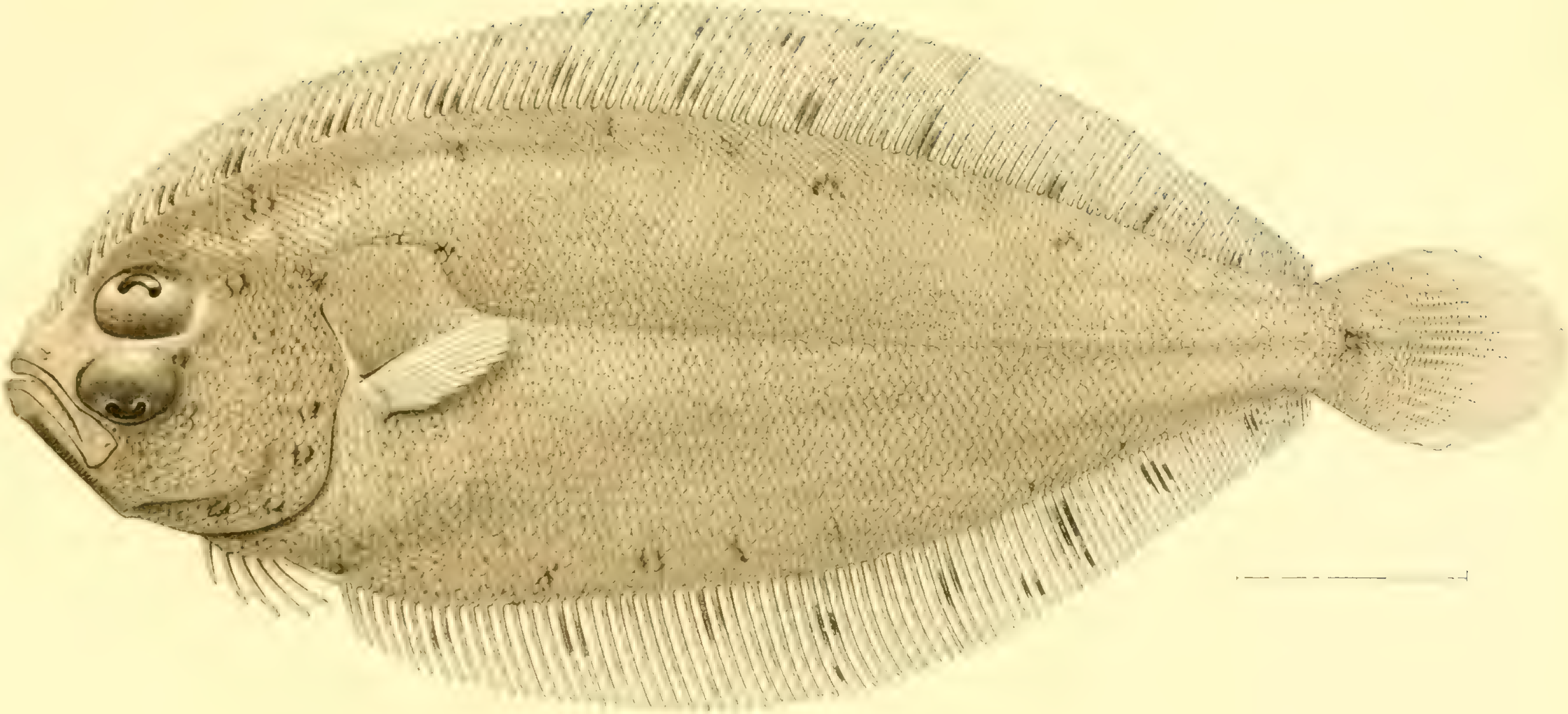


FIG. 267.—*Platophrys chlorospilus* Gilbert, new species. Type.

Anterior dorsal rays free for half their length, not produced or filamentous, increasing regularly in length from the first; left ventral inserted on the pre-anal ridge, membrane of last ray deflected to left side of ridge; vertical fins all low; caudal double truncate, or doubly emarginate, median ray produced; left pectoral twice as long as right, second and third rays prolonged somewhat beyond general contour of fin. In *P. mancus* of the same size and sex, the left pectoral would be greatly produced. Caudal rays branched, other rays simple.

Scales strongly ctenoid on left side, cycloid on right side; lateral line present on left side only, its anterior arch flat-topped; chord of arch contained 4.2 times in straight portion; interorbital space and mandible scaled; a few scales on exposed part of maxillary; terminal half of snout naked; single series of scales on dorsal and anal fin-rays and double series on caudal rays.



ANTICITHARUS DEBILIS GILBERT TYPE

In life, ground color olive-gray, flecked with olive-brown; a series of large spots near dorsal and anal outlines of body, and some intermediate spots olive-green, with olive-brown ocellating rings; an interocular bar, and some spots on rostrum bright greenish yellow; intervals between rostral spots with much blue; vertical fins finely dotted with brown, and marked with equidistant oblong brown spots.

Only the type specimen is known.

Platophrys inermis, new species. Fig. 268.

Type, a female, 179 mm. long, from station 4102, Pailolo Channel, between Molokai and Maui, depth 122 to 132 fathoms; type, No. 51648, U. S. Nat. Mus.

Length of head 26 hundredths of total length without caudal; length of snout, from lower eye 5.5, from upper eye 11; diameter of upper eye 8; interorbital width 3 (5.5 in male); length of maxillary 10; depth of body 45; depth of caudal peduncle 9.5; longest dorsal ray 10; longest caudal ray 19; longest ray of left pectoral 16; chord of curve of lateral line 16. D. 106; A. 86; P. 13; scales in lateral line 87.

Body sinistral, of moderate depth; outlines evenly curved; no angle above upper eye in either sex; mouth oblique; maxillary reaching vertical from front of pupil; mandibular symphysis with no spine and scarcely protruding beyond lower profile; teeth slender, conical, in a single series in each jaw; palate unarmed; front of upper eye slightly behind vertical from front of pupil of lower eye; interorbital space gently concave; gill-rakers slender, short, about 0.2 diameter of pupil, 10 in number on horizontal limb of outer arch.

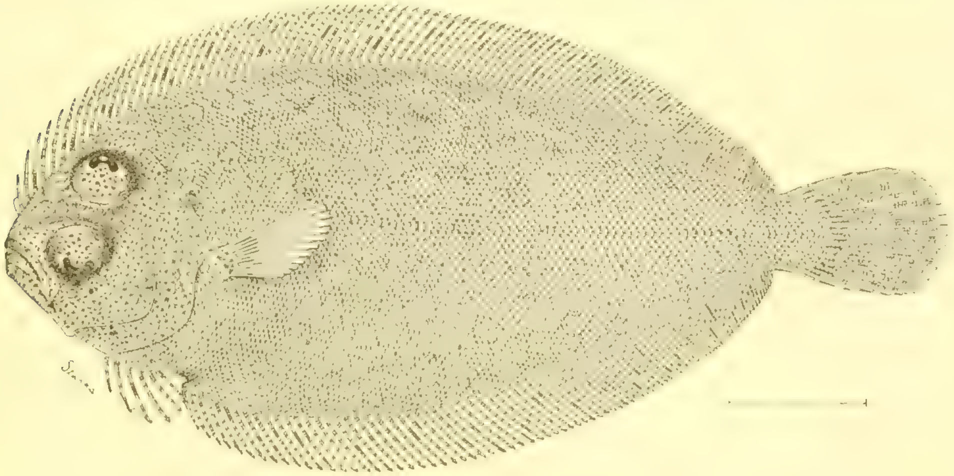


FIG. 268.—*Platophrys inermis* Gilbert, new species. Type.

First dorsal ray inserted well on blind side of snout, immediately above nostrils, more widely separated than other rays, and provided anteriorly with a free membranous flap; none of the dorsal rays produced or largely free; dorsal highest at origin of its posterior third; longest dorsal ray equaling distance from tip of snout to middle of lower eye; caudal peduncle without free portion; left ventral with an elongate base, its rays all inserted on ventral ridge; membrane from last ventral ray deflected to the left, leaving the ridge, and not connecting with front of anal fin; length of pectoral equal to distance from tip of snout to middle of upper eye, its uppermost ray very short, about 0.1 second ray; all the fins, except caudal, with rays unbranched.

Scales small, those on left (eyed) side rough-ctenoid, moderately deciduous; those on right side cycloid; right side without lateral line; lateral line on left side with a short high arch, which is broadly flat-topped, the summit being a horizontal straight line; chord of arch contained 4⅓ times in posterior straight portion of lateral line. A short supplemental branch forks and forms a V behind upper eye; maxillary and snout but partly scaled; rest of head, including mandible and interorbital space, wholly scaled; rays of dorsal and anal fins each with a single row of scales; pectorals and ventrals naked, except for 2 or 3 scales on basal portion of last 2 ventral rays; each caudal ray accompanied by a narrow band of scales.

Male specimens at hand average smaller than females. They differ only in the wider interorbital space, the slight lengthening of upper pectoral rays, which project beyond the normal margin of the fin, and the smaller eye, 3.5 in the head. The anterior profile is slightly steeper, with a very slight angle above eye. No tubercles or spines are developed on head in either sex.

Color in spirits, everywhere light brownish olive, closely freckled with fine dark spots which are most conspicuous on head; trunk with lengthwise series of round light olive spots, each surrounded by a darker ring; these conspicuous in young, but indistinct in older specimens; one series of spots, smaller and more numerous than the others, extends along bases of dorsal and anal fins; 2 or 3 well marked series of larger spots between these and lateral line; 2 or 3 light dark-edged streaks run forward and downward from upper eye to snout; rays of vertical fins finely spotted with dark, more elongate darker spots occurring at intervals along fins; pectorals unmarked.

A very young example, 45 mm. long, was taken at station 3957, near Laysan Island, 173 fathoms. The body is translucent, with small dark spots occupying the position of the future dark rings. The dorsal has 110 rays.

In 4 specimens, other than the type, the counts are as follows: Male, dorsal 113, anal 94, pectoral 13, scales 86; male, dorsal 109, anal 92, pectoral 14, scales 89; female, dorsal 108, anal 91, pectoral 13, scales 85; male, dorsal 107, anal 89, pectoral 14, scales 83.

The species was taken at the following stations: Nos. 3957, near Laysan Island, 173 fathoms; 4077, off north coast of Maui, 99 to 106 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

Platophrys coarctatus, new species. Fig. 269.

Type, a female, 162 mm. long, station 3859, Pailolo Channel, between Molokai and Maui, depth 138 to 140 fathoms; type, No. 51602, U. S. Nat. Mus.

Length of head 25.5 hundreths of total length without caudal; length of snout, from lower eye 6, from upper eye 9; interorbital width 1; length of maxillary 9; diameter of upper eye 7; depth of body 42; depth of caudal peduncle 10; longest dorsal ray 12; longest caudal ray 20; length of left pectoral 15, of right pectoral 8. D. 120; A. 99; P. 13; scales in lateral line 96.

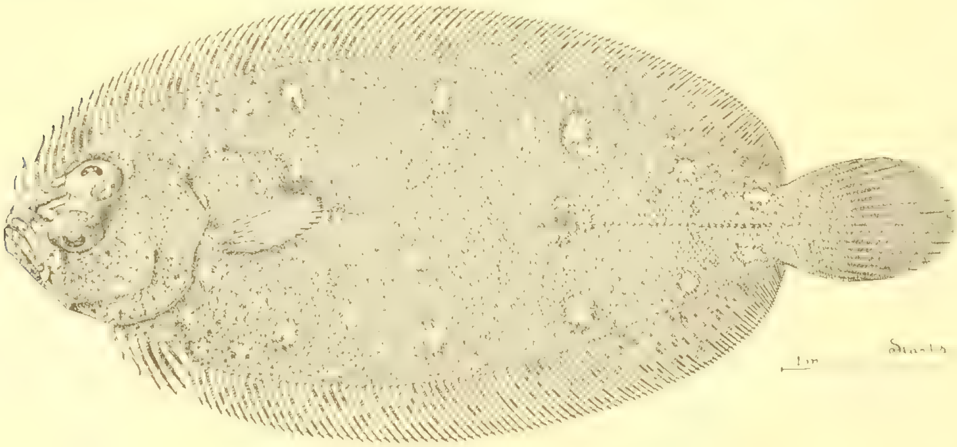


FIG. 269.—*Platophrys coarctatus* Gilbert, new species. Type.

Form regularly elliptical, with the 2 profiles evenly curved; a slight notch in middle of upper profile of snout; mouth rather small, very oblique, the maxillary not reaching vertical line from front of lower pupil; teeth in single series, present in jaws only, those on sides of premaxillaries small and close-set; anterior teeth larger and more widely spaced; mandibular teeth larger and more widely spaced than lateral premaxillary teeth; mandible massive, the 2 jaws equal, the symphysis not protruding; eyes separated anteriorly by a narrow groove, not half as wide as diameter of pupil, and alike in both sexes; below posterior half of upper eye the groove is narrowed to a sharp ridge; front of upper eye over front of lower pupil; no spines or tubercles in either sex; gill-rakers slender, the longest half or less than half diameter of pupil, 10 present on horizontal limb of arch; vertical limb without appendages, as in related species.

First dorsal ray inserted on blind side of snout, immediately above nostrils, the second ray on dorsal ridge; first few dorsal rays free from membrane for about half their length, but none of them produced, the first shorter than succeeding rays, which increase regularly; left ventral inserted upon pre-anal ridge, the membrane of last ray joining body immediately to left of first anal ray; pectoral of colored side nearly twice as long as that of blind side.

Scales very small, not closely adherent, rather weakly ctenoid on the left side, cycloid on the right; lateral line present on left side only; anterior arch flat-topped, its chord contained 5 times in straight portion of lateral line; interorbital groove naked immediately above middle of upper eye, elsewhere scaly; symphyseal portion of mandible and terminal half of snout naked; exposed portion of maxillary scaled.

Color, light olive-brown, profusely covered with green spots of varying size, each surrounded with a darker ring; series of spots, larger than the others, occur near dorsal and anal outlines, and halfway between these and lateral line; a short dash in front of upper eye and one behind it; a conspicuous sharply angulated streak connecting lower anterior margin of upper eye with anterior margin of lower eye; four conspicuous spots on lateral line, two of these near together, immediately behind arch, one at middle of straight portion, and one just in advance of caudal peduncle; dorsal and anal fins finely mottled with dark, with a series of regularly arranged darker blotches.

In 5 specimens, not including the type, there are the following fin and scale counts: Dorsal 115, 115, 116, 114, and 121; anal 95, 96, 96, 93, and 98; pectoral 14, 14, 14, 13, and 14; scales in lateral line 93, 94, 94, 93, and 94.

The species was taken at the following stations: Nos. 3859, Pailolo Channel, 138 to 140 fathoms; 3938, near Laysan Island, 148 to 163 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms.

Engyprosopon hawaiiensis Jordan & Evermann.

Two specimens, secured at station 4067, off the north coast of Maui, depth 10 to 14 fathoms, seem referable to this species. They are much lighter in color than the type specimen from Honolulu, and are very finely mottled with light gray and brown. A series of inconspicuous dark spots along the middle of sides, and others near base of dorsal and anal, can not be detected in the type. On close examination, however, the type shows the finer mottlings. Indistinct dark and light bars traverse the interocular space. The fins are finely freckled.

The fin rays are: Dorsal 79, 80; anal 57, 58; scales in lateral line 45, 46.

Engyprosopon xenandrus, new species. Fig. 270.

Type, a male, 86 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51651, U. S. Nat. Mus.

Most nearly related to *E. grandisquamis* (Schlegel) from Japan, readily distinguished from that species by the larger eye, provided with a fringed membrane in the male, by the much narrower interorbital space in the female, by the more elongate body, the more numerous fin-rays, and by certain details of color.

Length of head 29 hundredths of total length without caudal; length of snout, from lower eye 7, from upper eye 17; length of maxillary 11; longest diameter of upper eye 8; interorbital width 9 (2 in a female cotype of equal size); greatest depth of body 55; least depth of caudal peduncle 12; longest dorsal ray 15; longest anal ray 13; length of caudal 22; length of pectoral 20; chord of curve of lateral line 16. D. 88; A. 66; P. 12; V. 6; vertebræ 9 + 26; scales in lateral line 50, not including those on base of caudal fin; 12 scales in a nearly vertical series from origin of straight portion of lateral line to base of dorsal fin.

Body comparatively elongate; anterior profile (in males) abruptly angulated above upper eye, thence descending very steeply to near tip of snout, which projects, forming a re-entrant angle with descending profile; mouth small, oblique, maxillary scarcely reaching vertical from front of pupil, barely longer than diameter of lower eye; teeth small, villiform, in a single series in upper jaw and on sides of mandible, broadening to an irregular double series or a narrow patch near symphysis; palate smooth; vertical from front of upper eye passes through middle of lower eye (in males); interorbital width wide and deeply concave; opposing margins of orbits elevated; a strong spine immediately in advance of middle of upper eye, and a shorter compressed spine on anterior portion of its lower rim; a similar spine on upper anterior margin of lower orbit, and a slenderer spine near tip of snout; symphysis of lower jaw protrudes slightly, but the spine developed on chin in *E. grandisquamis* is wanting in this species; all spines wanting in females, in which also the interorbital space is of scarcely appreciable width; in the male, each eye is furnished posteriorly with a conspicuous broad semicircular membrane, the free margin of which is posteriorly directed and finely fringed; no trace of this membrane exists in females; gill-rakers short and slender, their length about half diameter of pupil, 12 in number on horizontal limb of outer arch.

Dorsal fin originating opposite the re-entrant angle near tip of snout, the first 3 or 4 rays inserted a little to the blind side of ridge, the first ray provided with a free membranous flap on its anterior edge, none of the rays elongate or with free tips; ventrals unsymmetrical, that of left or eyed side inserted on ventral ridge and having an elongate base beginning at throat, the membrane of last ray deflected to the left side of ventral ridge, and not joining first anal ray; anus displaced to the right side and lying a little posterior to origin of anal fin; right ventral with a short base, inserted laterally and posteriorly with reference to the left ventral.

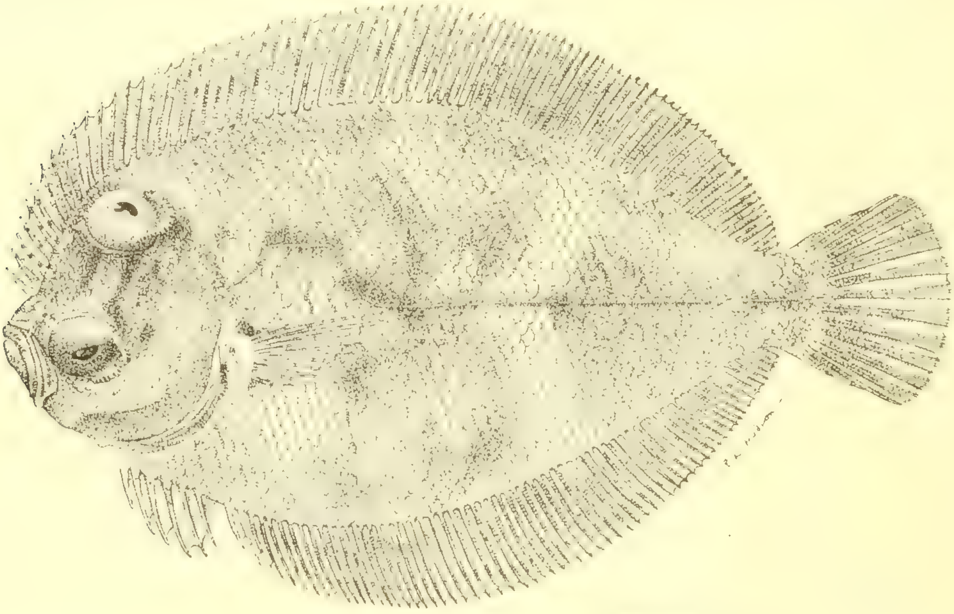


FIG. 270.—*Engyprosopon xenandrus* Gilbert, new species. Type.

Scales on left (eyed) side ctenoid and caducous, on right side cycloid and more closely adherent; cheeks, opercles, interorbital space and snout closely scaled; maxillary and mandible naked; lateral line describing anteriorly a high short curve, the chord of which is about twice its height.

Color in life, grayish on eyed side, with blackish shades and mottlings, with 3 ill-defined black spots along middle of sides and a grayish interocular bar bordered with blackish; axil of pectorals blackish; vertical fins more or less speckled; dorsal and anal usually with a subbasal series of dark spots alternating with a basal series of pearly spots; a pair of faint dark spots on caudal near its base; pectoral with a dark bar at base, a wider bar near middle of fin, and several ill-defined narrow bars on distal half; head and body with many small indistinct yellow spots; posterior half of blind side dusky, clouded with grayish; anterior half whitish; region behind preopercle marked with many narrowly elongate vertical lemon-yellow spots; anterior part of dorsal fin and snout marked with numerous small yellow spots; dorsal and anal edged with yellow, the color extending downward on rays.

Very numerous specimens were secured, the species being abundant in depths of 40 to 100 fathoms. The males occasionally develop 3 or 4 spines about upper eye instead of the 2 present in the type. The females are mature, the ovaries lying in a backward extension of body cavity along base of anal fin. The following fin-counts indicate the variation in this respect: Dorsal 79, 84, 86, 86, 87, 87, 87, 88, 89, and 91; anal 61, 65, 66, 66, 66, 68, 68, 66, 69, and 67.

Specimens were secured at the following stations: Nos. 3846, south coast Molokai, 60 to 64 fathoms; 3848, south coast Molokai, 44 to 73 fathoms; 3849, south coast Molokai, 43 to 73 fathoms; 3850, south coast Molokai, 43 to 66 fathoms; 3861, Pailolo Channel, 30 to 52 fathoms; 3875, Avau Channel, 34 to 65 fathoms; 3940, Laysan Island, 59 to 70 fathoms; 3963, Laysan Island, 319 to 44 fathoms; 4066, east end Maui, 176 to 49 fathoms; 4070, north coast Maui, 45 to 52 fathoms; 4071, north coast Maui, 52 to 56 fathoms; 4072, north coast Maui, 56 to 59 fathoms; 4073, north coast Maui, 69 to 78 fathoms; 4075, north coast Maui, 49 to 57 fathoms; 4076, north coast Maui, 57 to 68 fathoms; 4077, north coast Maui, 99 to 106 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms; 4133, vicinity of Kauai, 165 to 41 fathoms.

Chascanopsetta prorigera, new species. Fig. 271.

Type, a male 225 mm. long, from station 4080, off the north coast of Maui, depth 178 to 202 fathoms; type, No. 51605, U. S. Nat. Mus.

Length of head 23 hundredths of total length without caudal; greatest depth 34; least depth of caudal peduncle 5; longest diameter of orbit 6; interorbital width 3; length of snout, from lower eye 5, from upper eye 9; length of maxillary 14; length of mandible 19; length of left pectoral 15; length of right pectoral 3; length of caudal 17; chord of arch of lateral line 12. D. 125; A. 89; P. 14; scales in lateral line 140.

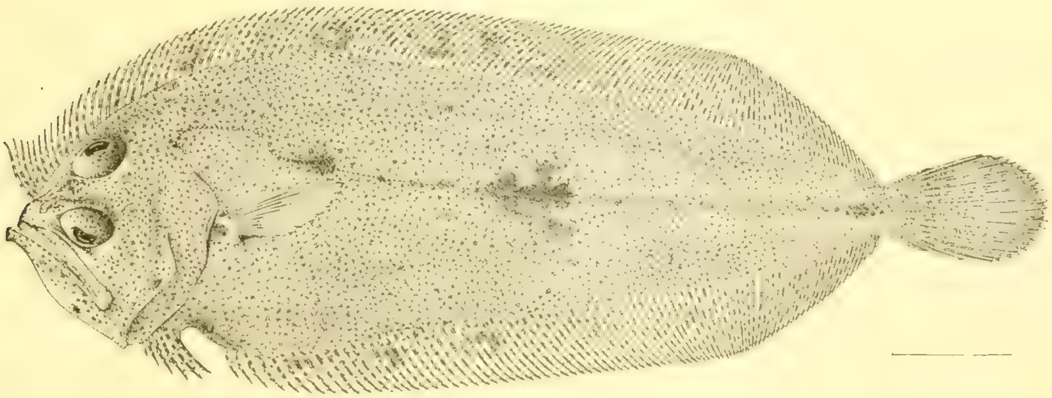


Fig. 271.—*Chascanopsetta prorigera* Gilbert, new species. Type.

Body very thin, as in *Cynicoglossus*, in shape a very elongate oval, the greatest depth immediately behind curve of lateral line, the upper and lower profiles behind this point gently converging and nearly straight; caudal peduncle free for a distance equaling half diameter of pupil. Head very deep; preopercular angle blunt; vertical height of cheeks nearly 3 times their longitudinal width; upper profile faintly incurved behind terminal part of snout; eyes well separated, interorbital space naked, deeply concave; upper eye a little behind the lower, its anterior margin in a vertical which traverses lower eye halfway between its front and front of pupil; mouth large and very oblique; maxillary very long and slender throughout, its tip reaching vertical from hinder margin of lower eye; each mandibular ramus becomes vertically dilated to form a thin lamella in the middle of its length; toward symphysis, the lower jaw becomes very narrow, the dentigerous portion protruding beyond snout for half diameter of pupil; teeth large, equal, rather distant, in single series, hooked and depressible inward; a pair of long membranous palps, each folded over longitudinally, with their free margins directed inward, depend from roof of mouth behind vomer; they are directed forward, their tip reaching base of anterior teeth; gill-rakers nearly obsolete, 4 or 5 very short movable ones next the angle.

Dorsal fin beginning on snout immediately above anterior nostril; first ray inserted very slightly toward right side of ridge; anterior rays joined by membrane at base only, succeeding rays exserted progressively less; the first ray is longer than any of those that immediately succeed it, these decreasing rapidly to fifth or sixth ray, then slowly lengthening, the longest rays at beginning of posterior third of fin; anal fin similar, without anterior lobe; caudal lanceolate; the anterior two-fifths of base of left ventral lying between interopercles, the base lying along pre-anal ridge, its posterior membrane very short, attached immediately behind last ray, leaving a long free space between ventrals and first anal ray; left pectoral long, about two-thirds length of head; right pectoral shorter than diameter of pupil.

Scales minute, everywhere cycloid; rays of caudal fin accompanied by series of scales, other fins naked; lateral line equally and similarly developed on both sides, the anterior curve short, rather low, flat-topped, its chord contained 6 times in straight portion of lateral line.

Color very light brownish olive, everywhere coarsely flecked with light brown; peritoneum blue-black, the color visible through the thin abdominal walls; three irregular dark blotches, with black centers shading into brown, lie along lateral line, the first small, just behind curve of lateral line, the second and longest in advance of middle of straight portion, the third near tail; dorsal and anal finely mottled, with a series of inconspicuous large brown spots along basal half; caudal membrane blackish; left pectoral dusky.

The stomach was distended with the partially digested remains of some fish. Only the type is known. The species differs strikingly from *C. lugubris* Alcock (Jour. As. Soc. Beng., vol. 63, 1894, p. 129, pl. 6, fig. 4), from the Bay of Bengal, 145 to 250 fathoms, in the shape of anterior curve of lateral line. In *C. lugubris* the anterior portion of lateral line is sharply angulated above base of pectorals, while in *C. prorigera* there is the flat-topped curve common among species of *Platophrys*.

Pelecanichthys crumenalis Gilbert & Cramer.

This most peculiar flounder was taken sparingly on sandy and muddy bottom at depths of from 238 to 344 fathoms. It was found only in the Pailolo Channel and its approaches, and in the southerly continuation of the Kaiwi Channel, where it was originally obtained. Its food consists of shrimps and other small crustacea. The genus is probably most closely related to *Chascanopsetta* Alcock.

Taken at the following stations: Nos. 3839, Pailolo Channel, 259 to 266 fathoms; 3865, Pailolo Channel, 256 to 283 fathoms; 3866, Pailolo Channel, 283 to 284 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3909, off the south coast of Oahu, 308 to 322 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 337 to 344 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4083, off the north coast of Maui, 238 to 253 fathoms; 4097, Pailolo Channel, 286 fathoms.

Pelecanichthys crumenalis Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 433, pl. XLVII.

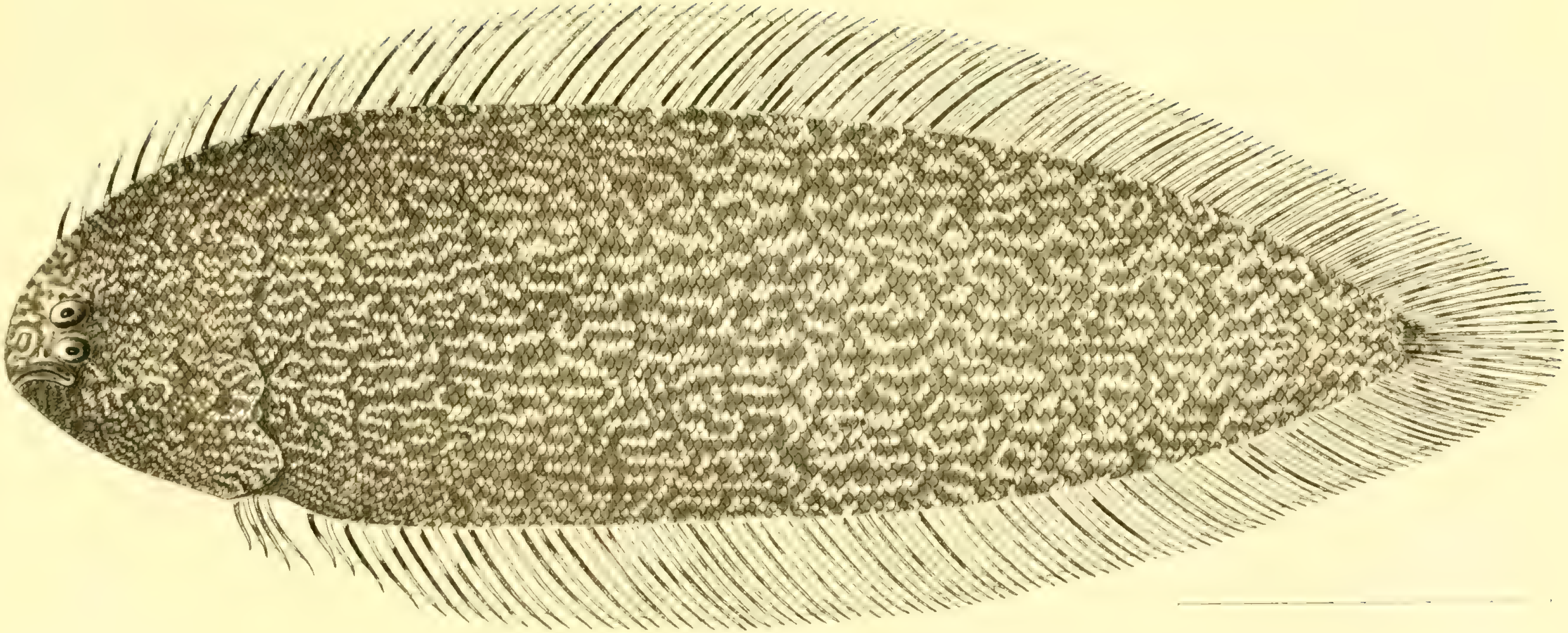
Family SOLEIDÆ.

Symphurus undatus, new species. Plate 98.

Type, 105 mm. long, from station 4114, off the northwest coast of Oahu, depth 154 to 195 fathoms; type, No. 51619, U. S. Nat. Mus.

Head 4.85 in length to base of caudal; depth 3.28. D. 97; A. 87; V. 4; C. 14; series of scales downward and backward, counted along middle of sides, 113.

Body of moderate depth, with a narrow truncate caudal base; mouth greatly curved; maxillary reaching vertical from middle of lower eye; eyes very close together, upper slightly in advance; posterior two-thirds of interorbital space occupied by a rather irregular patch of scales which encroach on eyes; between anterior portions of eyes, the usual broad flap, beneath which opens posterior nostril; anterior nostril in a long tube immediately above upper lip, and slightly nearer lower eye than extremity of snout; on blind side, the anterior nostril tube is the shorter; posterior nostril slit-like, at upper end of a vertical fold which runs upward from a point in front of angle of mouth.



SYMPHURUS UNDATUS GILBERT. TYPE.

JULIUS BIEN & CO. LITH. N.Y.

First dorsal ray inserted over middle of eye; ventral consisting of 4 rays, its posterior membrane ruptured in the type.

Scales very strongly ciliated on both sides of body. No trace of lateral line.

Color, a warm brown, with narrow, wavy streaks of light olive, the streaks running in all directions and irregularly anastomosing; fins translucent, with frequent rays which are brown for the greater part of their length; other rays more or less brown.

A single cotype, from station 4120, off northwest coast of Oahu, 167 to 216 fathoms, shows the following formula: D. 103, A. 88; V. 4; scales 106. In this smaller specimen the anastomosing wavy lines are wider and less clearly defined.

Symphurus strictus, new species.

Type, 106 mm. long, from station 3920, off the south coast of Oahu Island, depth 265 to 280 fathoms; type, No. 51624, U. S. Nat. Mus.

Head 5 in length to base of caudal; depth 4.2. D. 115; A. 102; C. 14; V. 4; series of scales running downward and backward 120.

Very elongate; mouth curved; maxillary reaching vertical from front or middle of pupil; eyes very small, close together, the upper slightly in advance of lower, between them a single series of scales, in addition to which, scales are sometimes present on adjacent parts of eye; anterior portion of interorbital space occupied by a wide flap, under which posterior nostril opens; right anterior nostril tubular, immediately above upper lip, slightly nearer lower eye than tip of snout; left anterior nostril slit-like, opening under upper end of a vertical fold which extends upward from behind angle of mouth; snout, jaws, and chin, and a narrow streak along profile to front of dorsal naked.

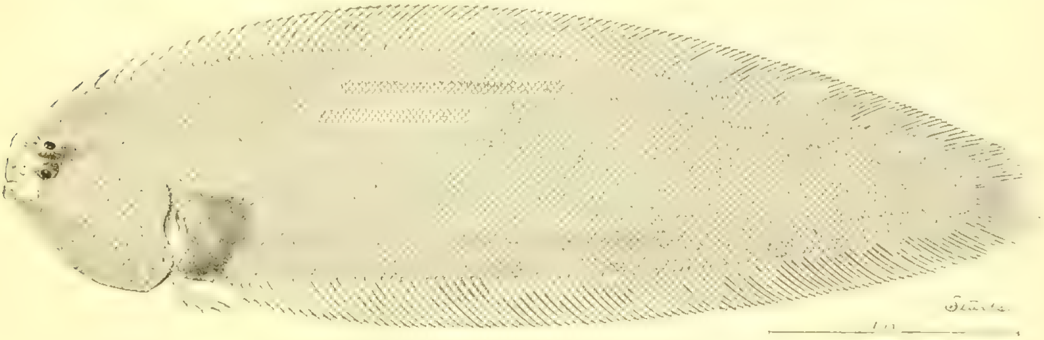


FIG. 272.—*Symphurus strictus* Gilbert, new species. Type.

Dorsal fin beginning above middle of upper eye; caudal with a vertically truncate base, its rays easily distinguished from dorsal and anal; membranes of last ventral ray joining first anal ray above its middle. Scales adherent and very strongly ctenoid on both sides; no trace of a lateral line.

Color light olivaceous, faintly marbled with light olive-brown; indistinct narrow dark lines follow the rows of scales; fins slightly dusky, unmarked; peritoneum jet-black; color showing distinctly through the abdominal walls.

Four cotypes were secured at station 4021, off the east coast of Kauai, at a depth of 286 to 399 fathoms. In 3 of these the counts are as follows: Dorsal 108, 109, and 113; anal 95, 95, and 98; ventral 4, 4, and 4; scales 125, 117, and 114.

Family LOPHIIDÆ.

Lophiomus miacanthus, new species. Fig. 273.

Type. 143 mm. in total length (from mandibular tip to margin of caudal) from station 4117, off the northwest coast of Oahu, depth 253 to 282 fathoms; type, No. 51627, U. S. Nat. Mus.

Length of head equaling distance from gill-slit to middle of caudal; width equaling its length; major diameter of eye contained 4.8 times in head, frontal width above middle of orbits 4.5; length of snout 3.8; protruding portion of mandible 7; length of maxillary 1.9; maxillary reaching a vertical from front of pupil. D. III–II–8; A. 7; P. 21; V. I, 5; C. 8; branchiostegals 6; vertebræ 18.

Teeth in front of mandible in about 3 series; inner series much the longest; all depressible, except some of smaller teeth of outer row; laterally, the mandibular teeth are reduced to a single series; premaxillary teeth in 2 series; in outer series, 5 or 6 of anterior teeth closely spaced, of moderate length, depressible; lateral teeth about 10 in number, short, rigid, widely spaced, slightly increasing in length toward angle of mouth; a single vomero-palatine series of very unequal teeth; each lower pharyngeal with 2 series of long teeth diverging backward; a few similar teeth forming a transverse series on each upper pharyngeal; gills 3, the fourth arch without filaments; no gill-rakers; pseudobranchiæ present; gill-opening unusually wide, the membranes free from arm along entire anterior, inferior and posterior aspects of the latter, attached only to a portion of superior side of arm; supraocular rim composed of a projecting thin lamella strengthened by 3 ridges which radiate outward and forward, and terminate in short spines; two of these project outward above posterior half of eye, the third directed forward, its tip in advance of pupil; a short spine rises vertically from the point on interorbital space to which these ridges converge; immediately behind upper part of orbit, a spine marks inner end of a blunt transverse ridge; behind middle of eye are 3 lower points arranged in a lengthwise series, the anterior 2 connected by a ridge; other spines on occiput and opercular bones occupy the usual position; occipital ridges prominent, bearing each a single spine, and then turned obliquely outward and backward; nasal spines double; immediately behind them, the anterior and posterior nasal openings are found near the tip of the heavy club-shaped nasal tubercle.

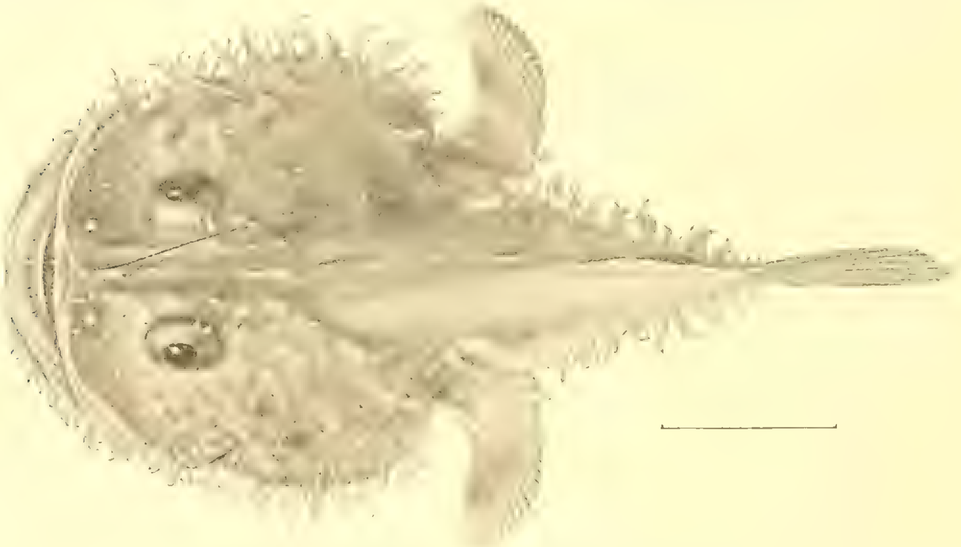


FIG. 273.—*Lophiomus miacanthus* Gilbert, new species. Type.

Anterior 2 dorsal spines close together near tip of snout; the first but little shorter than the second, which extends a little beyond base of third; first spine black, terminating in a small but conspicuous short, white, fleshy tip, which narrows to a minute cirrus; second spine grayish, without tentacles or flaps; third spine located directly between the 2 occipital spines, and reaching with its tip to or slightly beyond origin of soft dorsal; at beginning of its terminal fourth it is bordered by a short membranous expansion, which rapidly tapers and disappears; the terminal fourth is white, and a dusky bar frequently crosses membrane; second group of dorsal spines represented by a single very weak spine shorter than pupil, with sometimes the rudiment of a second; last dorsal and anal rays not bound down to caudal peduncle.

Labial fringes well developed; a series of slender nearly simple filaments accompanying lateral line; abdomen covered with widely spaced short fimbriated flaps, some wide and some narrow, these white in color on a dark background, and very conspicuous.

Color in spirits, light grayish above, much mottled with darker; filaments on sides of snout arising each from a small round light spot, contrasting with the darker ground; under parts lighter; abdomen usually dark, covered with sharply contrasting white flaps; mouth and gill-cavities white, peritoneum jet-black.

Stomach globular, very large, the 2 openings immediately adjacent; intestine crossing the stomach transversely in front, communicating with it in passing, and terminating in a blind sac, which represents the single pyloric cæcum; left liver lobe short; right long and narrow, extending to near middle of body cavity, its posterior end slightly hollowed out for the gall-bladder; intestine making a single short loop, its length but two-thirds total length of fish; the stomach contained the remains of a small fish, together with considerable mud, which was probably swallowed during capture of fish.

Specimens were taken at the following stations: Nos. 3998, vicinity of Kauai, 228 to 235 fathoms; 4096, approach to Pailolo Channel, 272 to 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Family CHAUNACIDÆ.

Chaunax umbrinus, new species. Fig. 274.

Type 54 mm. long, from station 3885, Pailolo Channel, between Maui and Molokai; type, No. 51547, U. S. Nat. Mus.

Closely related to *C. fimbriatus* Hilgendorf, from Japan, but the spines finer and shorter, the fins higher, the pectorals with more numerous rays, and the color dark.

Head 65 hundredths of total length to base of caudal; maxillary 22; interorbital width 9; length of tentacular groove 8; length of tentacle 6; diameter of eye 13; greatest depth (uninflated) 32; greatest width, at base of pectorals 54; distance from tip of snout to origin of dorsal 56; length of dorsal base 34; longest dorsal ray 17; length of caudal 36; length of pectorals 17; length of ventrals 15. D. 11, A. 5, P. 14.

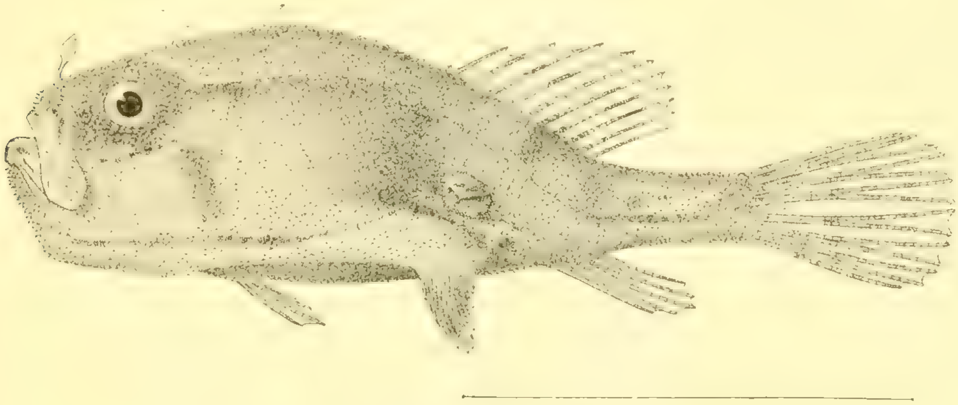


FIG. 274.—*Chaunax umbrinus* Gilbert, new species. Type.

Tentacle somewhat shorter and thicker than in *C. fimbriatus*, occupying about three-fourths the groove; sensory canals arranged as in *fimbriatus*, but the lateral lines approach more nearly the front of dorsal fin; spines much shorter and finer, resembling shagreen; skin opaque, dark gray on upper parts, mottled and blotched with darker shades; caudal blackish, with a lighter cross-bar on basal half; pectorals black, with some grayish lines at base; ventrals yellowish; under parts grayish, uniform.

One specimen known.

Family CERATIIDÆ.

Miopsaras, new genus.

Like *Mancalias* and *Cryptopsaras*, but with basal joint of the single dorsal spine thickened and greatly reduced in length, directed forward and lying concealed in a shallow pit, its distal portion represented by a short, slender, fleshy filament attached to tip of the heavy basal portion, which does not taper into it. A pair of caruncles, without median element, as in *Mancalias*.

Body narrowly compressed, back gently arched, anterior profile and cleft of mouth directed downward and forward, lower profile rising in a nearly straight line to the slender caudal peduncle; vomer and palatines toothless; gill-opening a nearly vertical slit below axil of pectoral; gills $2\frac{1}{2}$, the anterior arch attached for the greater part of its length, as in *Macrourus;* filaments of outer series of anterior arch but half as long as those of inner series, with which they alternate; third arch with a single series of filaments, and attached throughout; no gill-rakers developed; eyes minute and inconspicuous; pectorals short, with 18 rays; ventrals absent; skin densely covered with minute spines, which form a fine shagreen.

Miopsaras Gilbert, new genus of *Ceratiidæ* (*myops*).

Miopsaras myops, new species. Plate 99.

Type, 114 mm. long (from mandibular articulation to tip of caudal), from station 4019, in the vicinity of Kauai Island, depth 409 to 550 fathoms; type, No. 51637, U. S. Nat. Mus.

Length of head from tip of snout to gill-slit 0.1 greater than vertical depth at snout; greatest width of head contained 2.7 times in length; length of snout 2.75 times; distance from tip of snout to end of maxillary 2 times. D. 4; A. 4; P. 18; C. 8.

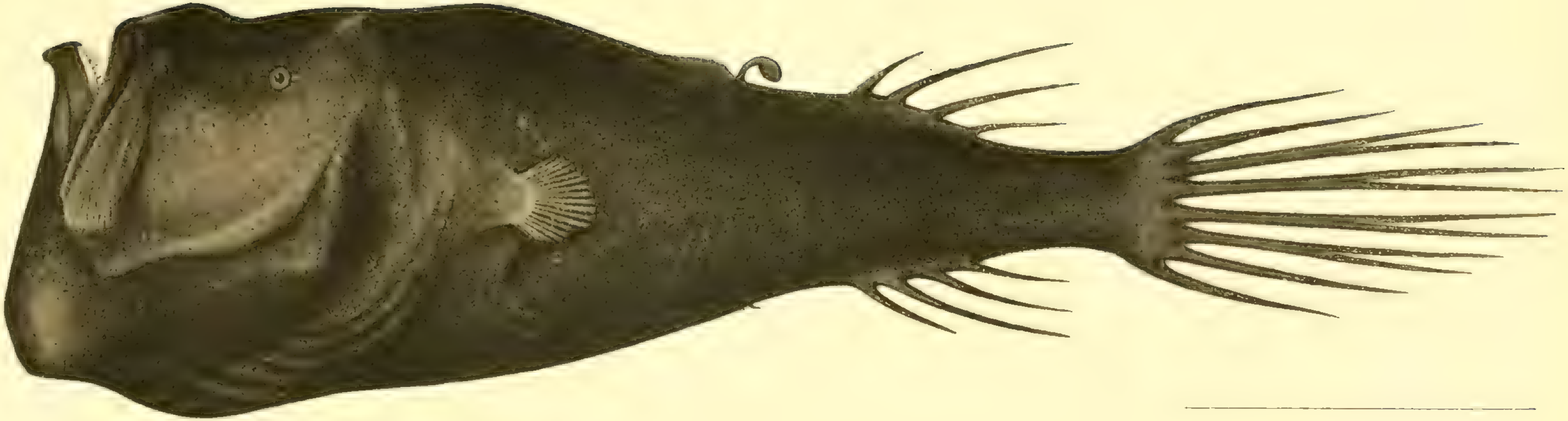
Mandible included, its symphysis provided with a strongly protruding spinous tip; mandibular teeth anteriorly in 2 ill-defined series; inner teeth long and fang-like, all depressible; premaxillary teeth in 2 or 3 poorly marked series, the largest teeth located anteriorly in the inner row, not half size of mandibular fangs; tongue, vomer, and palatines toothless; a long slender nasal tube near tip of snout, apparently with 2 perforations at its summit; gill-slit longer than pectoral fin, contained 6 times in length of head, its upper end behind lower pectoral rays, the direction of the slit downward and a little forward.

Dorsal spine inserted but little behind eye; length of basal portion less than 3 times its width, about twice diameter of eye, and about 0.1 length of head; spine directed forward, in a shallow, naked groove, the naked area narrowing in front of spine and continued well beyond it, about halfway to tip of snout; to the tip of the basal portion, at its anterior (lower) face, is attached a slender white filament, hardly to be made out with the unaided eye, the spine and filament scarcely extending halfway from their base to tip of snout; caruncles opposite each other; distance from their insertion to front of dorsal about equal to base of latter; no globular body between them, but immediately in front, on median line, a slight elevation of the integument, containing a shallow, naked pocket, opening posteriorly; no pore could be detected opening into base of this pocket; caruncles each with a very slender stalk and an enlarged globular head, the latter having a specialized area at tip, devoid of prickles and covered with a thin opaque white integument; each caruncle perforated at tip by a short slit or pore; fin rays all simple, except the 4 middle rays of caudal; longest caudal ray 0.85 length of head; pectoral very short, its length equaling that of gill-slit; vent separated from anal fin by a distance equaling base of latter.

Entire body, including all the fin rays, invested with close-set prickles; the groove for dorsal spine, the spine itself, tips of caruncles, eye, and lips the only naked areas.

Body and fins everywhere jet-black; mouth cavity whitish with dusky areas.

Only the type is known.



MIOPSARAS MYOPS GILBERT. TYPE

Family OGCOCEPHALIDÆ.

Malthopsis mitrigera Gilbert & Cramer.

Fifty-two specimens were taken at 13 stations, the depth ranging usually from 250 to 300 fathoms.

Median portions of breast and belly as fully plated as the back; antero-lateral margin of disk furnished with 2 series of plates separated by a shallow groove; below these, posteriorly, a third series which runs from angle to point opposite posterior margin of orbit, where it turns abruptly mesad and joins its fellow across middle of breast; the naked space containing anal opening surrounded anteriorly and laterally by 2 parallel series of plates, the outer of these crossing median line immediately behind ventral fins, and continued laterally along posterior lower margin of arm; breast with 2 large plates on middle line, and a series of plates on either side which pass between bases of ventrals and diverge anteriorly; upper half of eye above pupil covered with small plates with radiating ridges, the lower series of these larger and centrally elevated; vomerine teeth minute, forming a moderate transverse band; separated from this band by a narrow line, on each side, is a small round palatine patch much less than half size of vomerine patch; tongue covered with retrorse teeth; longitudinal diameter of orbit two-fifths its distance from gill-opening; anterior nostril in a short tube, rather widely separated from posterior, which is a small roundish pore; when extended, the pectorals fail to reach tip of subopercular spine; ventrals not nearly reaching margin of disk; no functional gills on first or fourth arches.

Our specimens range in length from 33 to 80 mm. The younger individuals differ in no essential features from the adults.

In the Zoological Record for 1896, Vol. XXXIII, Pisces, page 22, Gilbert and Cramer are erroneously credited with establishing *Malthopsis* as a new genus for the reception of the present species. This error is repeated in the Index Zoologicus, 1902, page 211. A glance at the original description of *Malthopsis mitrigera* shows that it is proposed as a new species of Alcock's genus *Malthopsis*, to which it belongs. "*Malthopsis* Gilbert and Cramer" does not exist.

Specimens were taken at the following stations: Nos. 3839, off the south coast of Molokai, 259 to 266 fathoms; 3865, Pailolo Channel, 256 to 283 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 4096, northeast approach to Pailolo Channel, 272 to 286 fathoms; 4097, northeast approach to Pailolo Channel, 286 to — fathoms; 4117, off the northeast coast of Oahu, 253 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Malthopsis mitriger Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 431, pl. XLVIII, figs. 1, 2

Malthopsis jordani, new species. Plate 100.

Type, 85 mm. long, from station 3853, off the south coast of Molokai, depth 115 to 134 fathoms; type, No. 51625, U. S. Nat. Mus.

Length of disk, excluding pectoral basis, 52 hundredths of total length without caudal; greatest width of disk 60; length of caudal peduncle, from vent, 46; greatest width of caudal peduncle 17; distance from vent to front of anal 25; diameter of eye 12; interorbital width 4.5; width of mouth, between tips of maxillaries, 11; length of caudal 25; longest pectoral ray 20; longest ventral ray 19. D. 6; A. 4, P. 13; V. I, 5.

Interorbital space gently concave, very narrow anteriorly; upper orbital rim bearing a blunt tubercle above posterior margin, a smaller one above middle of orbit, and 2, rather indistinct, anteriorly at base of rostral process; rostral process robust, directed vertically upward, its anterior margin descending without notch or other interruption to a point below middle of orbit; rostral tentacle robust, short, not reaching margin of premaxillaries when laid forward; no narrowed stem can be distinguished below the thick oblong end or lure; mouth very narrow; a narrow band of minute teeth in front of lower jaw, with a much wider band of cardiform teeth behind it; premaxillary band narrower; entire surface of tongue beset with coarse teeth directed backward; a broad roundish patch of teeth on vomer, with an oval palatine patch on either side, separated only by narrow lines; palatine patches nearly as large as vomerine patch; anterior nostril with a reflexed margin but no tube, closely adjacent to posterior nostril, which is a long transverse slit; two double gills on each side, the anterior gill-arch very short, provided with a few spinous rakers, but without gill-filaments, the position of the latter being occupied by a thin fleshy lamina; no functional filaments on fourth arch, a short adherent crescentric lamina sometimes present, seeming to represent the obsolete gill, its margins with divisions faintly indicated; disk comparatively narrow, with rounded outlines; lateral process projecting but little, armed with a short strong spinous point directed forward and a shorter one turned backward; dorsal surface of disk, and entire tail, covered with large and small tubercular plates, arranged much as in *M. mitrigera*, but less numerous and much less prominent; lower surface of disk almost naked, containing only a few scattered rudimentary plates, without definite arrangement, except for the usual presence of one in middle of breast; a single series of 4 or 5 small plates crosses eye above pupil.

When bent outward and forward, the pectorals extend well beyond tip of subopercular spine; ventrals widening toward tip, their inner (posterior) rays the longer, not reaching margin of disk when extended; caudal half length of head.

Color, upper parts covered with a fine reticulum of dark lines over a grayish or light brownish ground; 2 or 3 irregular dark blotches on margin of disk, a pair on nape, an irregular lengthwise blotch above and behind gill-opening, an irregular bar below dorsal, one on middle of caudal peduncle, and a narrow one at base of caudal; a transverse dark bar crosses caudal behind its middle, and an intramarginal bar crosses pectoral. Specimens taken from the white coral sand in the vicinity of Laysan Island are nearly uniform white in color, the smallest individual, 30 mm. long, having middle of disk marked by numerous small bright white spots, on a dusky ground; faint traces of the reticulum can be distinguished on the palest specimens.

In the cotypes, the dorsal rays vary from 5 to 6, the pectorals from 12 to 13. The anal rays seem to be invariably 4.

Malthopsis jordani is closely related to *M. mitrigera* and to *M. lutea* Alcock (Ann. Mag. Nat. Hist., (6), VIII, 1891, 26, pl. 8, figs. 2, 2a), all of them with comparatively narrow triangular disk and narrow interorbital space, the body covered with coarse tubercular plates. The species described by Garman from the Mexican and Central American province have wider disks, with the lateral spine directed backward, or obsolete, the interorbital space wider and more depressed, and the investment of body largely in form of prickles.

The species was taken at the following stations: Nos. 3853, off the south coast of Molokai, 115 to 134 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3938, vicinity of Laysan, 148 to 163 fathoms; 3965, vicinity of Laysan, 116 to 147 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms.

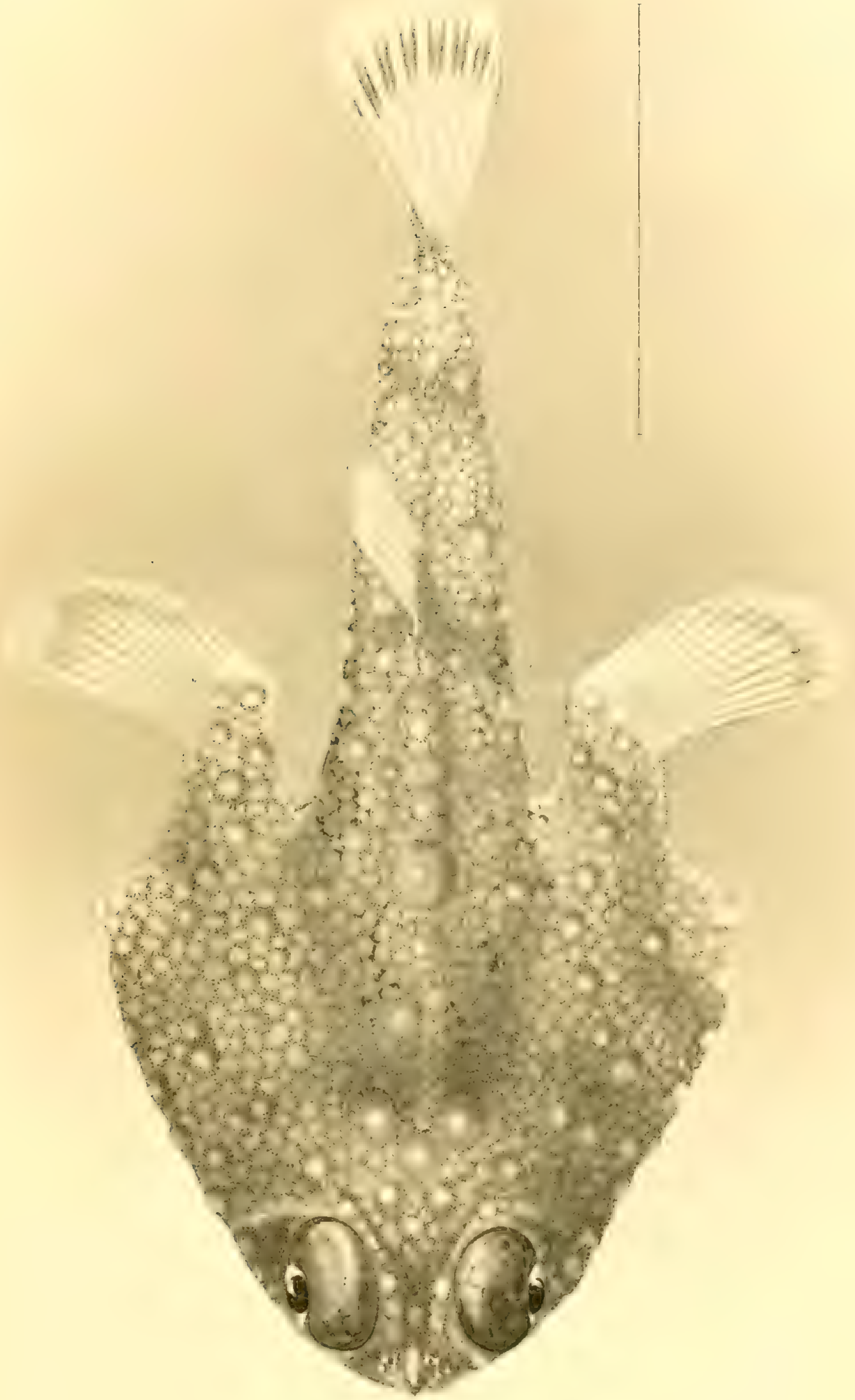
Halieutæa retifera, new species. Plate 101.

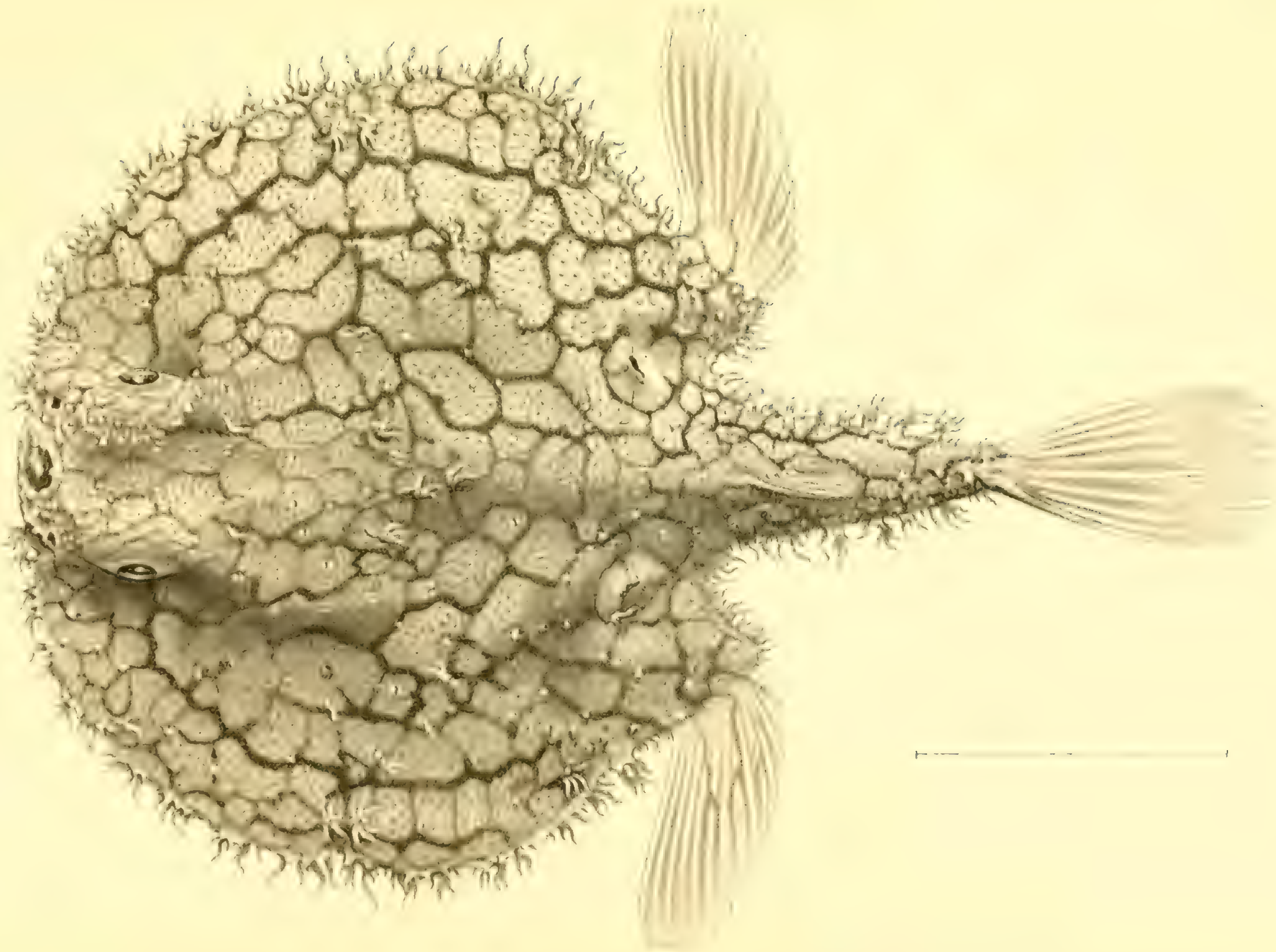
Type, 101 mm. long, from station 4076, off the north coast of Maui, depth 57 to 68 fathoms; type, No. 51597, U. S. Nat. Mus.

Length of disk (excluding pectoral base) 70 hundredths of total length to base of caudal; width of disk 81; length of caudal peduncle, from vent, 34; greatest width of caudal peduncle 16; diameter of orbit 12; least interorbital width 7.5; width of mouth, measured between tips of maxillaries 33; length of caudal 29; longest pectoral ray 25; longest ventral ray 18. D. 5; A. 4; P. 14; V. I, 5.

Disk subcircular, broader than long, its width equal to distance from tip of snout to end of declined dorsal rays; head and snout not protruding at all beyond the regularly curved contour, and the carpus not exserted; snout and orbital rims a little elevated; eyes directed laterally; interorbital space concave, bounded laterally by orbital rims, anteriorly by a transverse ridge which separates it from the nasal fossæ and the tentacular cavity; anterior nostril small, with a short tube; posterior a large circular opening without tube or reflexed rims; lure trilobate, with a superior medial and a pair of hemispherical lateral lobes, the latter fringed below and separated medially by a deep cleft; teeth minute, in rather wide bands in both jaws, nearly reaching corners of mouth; vomer and palatine bones without teeth; tongue very little developed, without free tip, and toothless, broad patches of the lower pharyngeals seeming to occupy its posterior portion; gill-openings small pores, wholly on upper surface of disk, well in advance of its posterior margin; gills 2½, the anterior arch with filaments, the posterior with a well-developed series of filaments, but without a slit; branchiostegal rays 6; no pseudobranchiæ.

Upper surfaces thickly beset by minute spines, the basal portion of which presents usually a triradiate arrangement of ridges; a few somewhat larger, but similar, spines scattered without definite arrangement among the smaller ones; lateral margins of disk depressed to a sharp edge, and occupied by a firmly united series of plates, each of which bears a marginal cluster of spines corresponding to





HALIEUTÆA RETIFERA GILBERT TYPE

sensory papillæ in the groove below them; a similar double series of spinous plates accompanies lateral line on infero-lateral aspect of tail, these, as well as those along lateral margins of disk bearing clusters of filaments as well as spines; lower surface of disk wholly smooth, save for a band of small spines and minute prickles which bound lateral line below; lower surface of tail, as far forward as vent, everywhere minutely prickly; the paired flaps which conceal the sensory papillæ are borne upon horizontal projections from the accompanying plates; flaps not narrowed at base, and bearing a fringe of short filaments along their free edge; the arrangement of the mandibular series of flaps agrees with that in *Dibranchus;* in addition to the papillæ which occupy the bottom of the mandibular groove, there are 3 accessory papillæ on each side the median line, which are placed upon the anterior margin of the groove, with their paired flaps arranged laterally, not transversely to the groove as in other papillæ; accessory papillæ placed contiguous respectively to first, fourth, and fifth of regular series.

Distance from origin of dorsal to base of caudal equals one-third its distance from tip of snout; when declined, the dorsal fin reaches slightly more than half its distance to caudal base; base of second anal ray midway between vent and caudal base; tips of anal rays reaching to or nearly to base of caudal when the fin is declined; ventrals reach a little more than halfway to margin of disk.

Color in life, light olive above, shading to pinkish brown around edges of disk, all the upper parts covered with coarsely reticulating reddish brown lines; under surface light brick-red, finely dotted with pearly white; a series of elongate silvery spots follows line of papillæ on mandible and sides of disk, those on disk larger, the filaments straw-color; caudal edged below and behind with orange-red, the fin otherwise white, marked with 3 indefinite yellow cross-bands which are dusky in their dorsal portions; pectorals, ventrals, and anal light brick-red, the pectorals lighter than the others. In the smallest of the cotypes, 44 mm. long, the caudal and pectorals have a broad terminal black bar with a narrow white edge, and the dorsal has a median dark blotch on its anterior rays. No note was made of the color of the dorsal in life; in spirits, it is nearly uniform dusky, with a light margin.

Specimens were taken at the following stations: Nos. 3810, off the south coast of Oahu, 53 to 211 fathoms; 3846, off the south coast of Molokai, 60 to 64 fathoms; 3855, off the south coast of Molokai, 127 to 130 fathoms; 3856, Pailolo Channel, 127 to 127 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 4064, off the northeast coast of Hawaii, 63 to 107 fathoms; 4076, off the north coast of Maui, 57 to 68 fathoms.

Dibranchus erythrinus, new species. Fig. 275.

Type, 172 mm. long, from station 3985, vicinity of Kauai, depth 430 to 477 fathoms; type, No. 51642, U. S. Nat. Mus.

Length of disk 60 hundredths of total length without caudal; greatest width 62; width of base of caudal peduncle 17; distance from anal opening to base of caudal 41; diameter of eye 12; least interorbital width 11; width of tentacular cavity 7.5; width of mouth 30; greatest depth of head 26; base of dorsal 9; length of caudal 21; longest pectoral ray 22; length of ventrals 17. D. 6; A. 4; P. 15; V. I, 5.

Cephalic disk broadly ovate, the greatest width exceeding distance from tip of snout to gill-opening by a distance equaling half diameter of orbit; occipital and frontal regions elevated, evenly convex; profile descending rapidly over anterior half of orbits; rostral region short, cubical, scarcely projecting beyond mouth; tentacular cavity triangular, much wider than high; the broadly expanded tip of the tentacle trilobate; mouth very wide, the distance between angles slightly more than half length of head; teeth minute, in broad bands which nearly reach angle of mouth in both jaws; vomer, palate, and tongue edentulous; anterior gill-arch with large rakers but without filaments.

Bathybial characteristics well shown in the yielding skeleton and thinner integuments of head; dorsal surface of head, trunk, and tail everywhere thickly beset with tubercles, of which a large and a very small size predominate; all of them are strongly ridged, each ridge frequently terminating at summit in a distinct spinelet, 1 or 2 of which may considerably exceed others in length. The larger tubercles are evenly distributed and without definite arrangement on disk, those on trunk and tail disposed in 4 lengthwise series on each side, the 2 lower series forming between them a groove for the lateral line; the smaller tubercles are minute and cover densely the interspaces between the larger; margin of disk, snout, and superior orbital rim provided with similar tubercles with bifid, trifid or multifid tips; no especially developed spine on tip or on upper surface of snout; spines on margin of disk equal to those on sides of tail, and but little larger than those on posterior central portion of disk; subopercular spine small, beset with smaller spines turned in various directions; lower surface of disk thickly covered with plates like the smaller ones on dorsal surface, those in front of ventrals somewhat enlarged; two short series of spines on tail; outside the iris, the eye is thickly beset with small prickles; lateral line distinct, deeply channeled, bordered above and below, along sides of trunk and tail, by a series of spinous plates, one pair to each papilla; a pair of flaps, with narrow pedicels and expanded fringed ends, meet above each papilla, intervening between latter and the pair of spines; structures entirely similar along edge of disk; immediately contiguous to the first, fourth, and fifth papilla on each side of symphysis is an accessory papilla placed forward on anterior margin of groove; in this, the fringed lobes and projecting spines are arranged at sides of papilla, that is, parallel with groove, instead of transversely to groove as in those of the regular series.

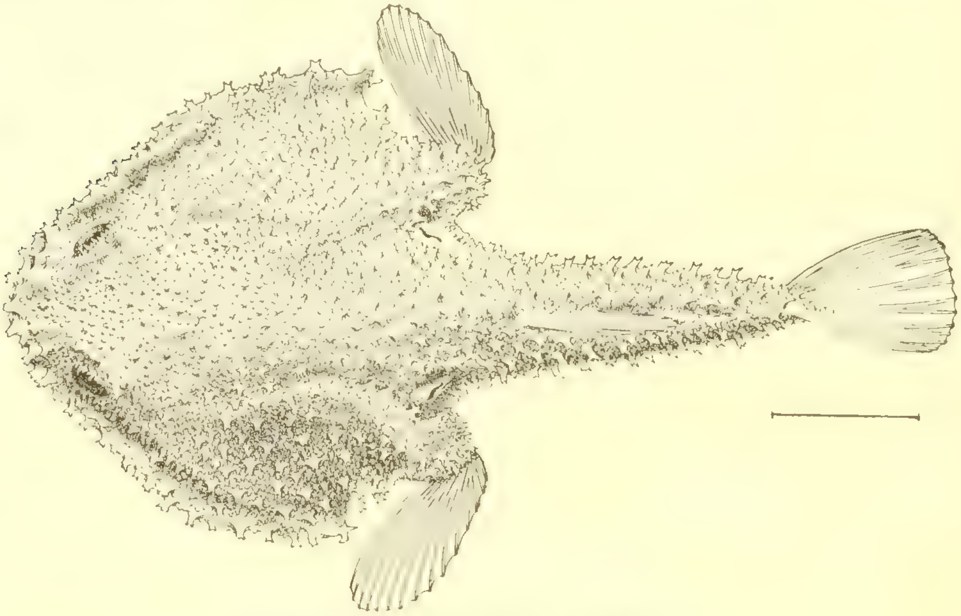


FIG. 275.—*Dibranchus erythrinus* Gilbert, new species. Type.

Distance from origin of dorsal to base of caudal a trifle more than half predorsal length; when the dorsal is declined, its tip extends halfway from its origin to caudal base; second anal ray equidistant from vent and base of caudal; when turned forward, the pectorals pass subopercular spine; ventrals not nearly reaching margin of disk.

In life, uniform light carmine-red, the blackish lining of gill-cavity and abdominal cavity faintly visible through the thin walls; lower surface suffused with purple; fins, lure, and buccal cavity unmarked; the fins deeper red or a little darker in color.

Only the type known.

Dibranchus stellulatus, new species. Fig. 276.

Type, 67 mm. long, from station 4080, off the north coast of Maui, depth 178 to 202 fathoms; type, No. 51595, U. S. Nat. Mus.

Greatest width of disk at base of subopercular spine much greater than its length, equaling distance from tip of snout to middle of dorsal base; length of disk 65 hundredths of total length, without caudal; greatest width of disk, not including lateral spines, 78; longitudinal diameter of orbit 11; the slightly concave interorbital width 11; width at base of rostral projection 12; length of the projection 12; width of mouth between angles 25. D. 6; A. 4; P. 14 or 15; V. I, 5.

Disk everywhere depressed, highest above middle of orbits; occiput broadly flattened and a little concave; antero-lateral outlines broadly rounded; snout forming a sharp, narrowly triangular projection, which is directed forward and upward, and extends well beyond mouth; outline of disk abruptly angulated at subopercular spine, gently and regularly concave from that point to base of pectoral fin; lure with a very short pedicle and a large trilobate head, the median portion of which is vertically incised in its lower fourth; nostrils closely contiguous, the anterior in a short tube, the posterior somewhat larger, with a slightly raised rim, which is elevated to form a short flap posteriorly; premaxillary teeth in a very narrow band, which tapers laterally to a point, and is confined to anterior three-fifths of bone; mandibular band also very narrow, of not more than 2 irregular series mesially, widening a little laterally and almost reaching buccal angle; vomer, palatines, and tongue without teeth; anterior gill-arch without filaments.

Bones firmer and integuments thicker than in *D. erythrinus;* upper surface of head, trunk, and tail thickly beset with sharp spines of nearly uniform size, which arise each from a conical base bearing 4 to 6, usually 5, strong radiating ridges, which give a strikingly stellate appearance viewed from above; spines simple, except on margins of disk and along side of tail, where they are variously divided, and bear from 2 to 5 points; those on dorsal surface of tail mostly bifid, with one point much longer than the others; preopercular spines directed outward and only slightly backward, each bearing a terminal rosette of spines; rostral spine similar but slenderer; spines accompanying lateral line thicker but not longer than the others; plates and spines on lower surface of disk and tail similar to those above, but smaller; dorsal surface of tail with a few very small spinous tubercles, which also form series on caudal rays; iris surrounded by a ring of small spines, a number of scattered ones outside this ring. Lateral line running in a shallow groove; each papilla is inclosed between 2 flaps, with narrow bases and fimbriate margins, the flaps flanked by a pair of spines; 3 accessory papillæ of the mandibular series, as in *D. erythrinus*, placed on anterior margin of groove opposite interval between first and second, fourth and fifth, and between fifth and sixth papillæ of the regular series.

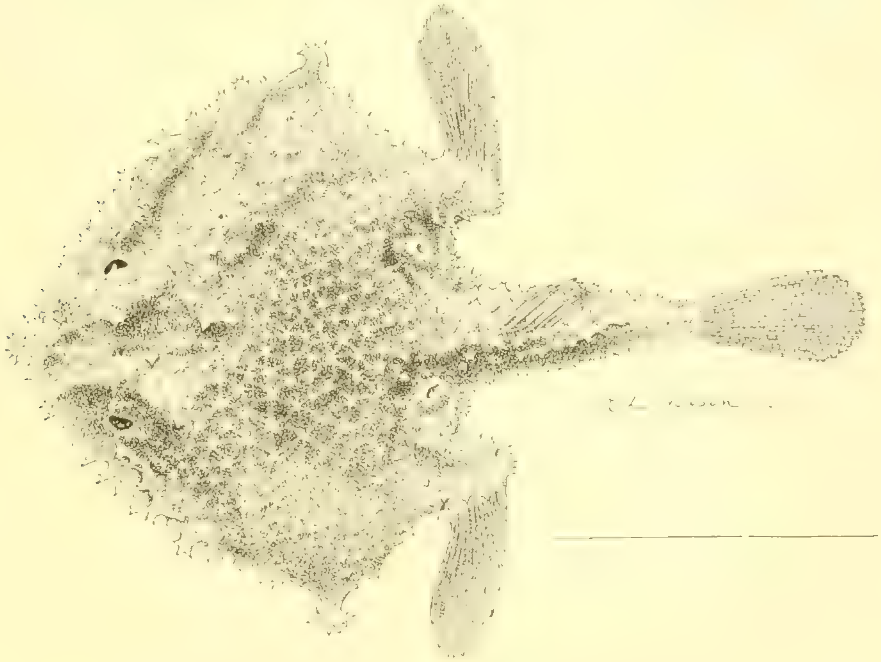


FIG. 276.—*Dibranchus stellulatus* Gilbert, new species. Type.

Distance from base of caudal to origin of dorsal half the distance from latter to front of orbit; when declined, the dorsal extends .6 the distance from its origin to base of caudal; base of dorsal .125 length of head; origin of anal fin slightly nearer vent than base of caudal; pectoral fin reaching base of subopercular spine, the short ventrals reaching but half-way to its tip.

Color, light olive-brown above, white below; 2 small black spots behind each eye, a second pair on each side the middle of disk, and a third pair above and in front of each gill-opening; a vertical dark shade immediately behind dorsal fin; a faint dark bar on terminal portion of dorsal and one on caudal; lining membranes of buccal, branchial, and abdominal cavities all white; lure unmarked.

Only one specimen taken.

LIST OF STATIONS AND OF SPECIES COLLECTED AT EACH STATION.

Station 3810. Depth 211 to 53 fathoms. Bottom fne. co. S.

Læmonema rhodochir, Halieutæa retifera.

Station 3813. Depth 183 to 264 fathoms. Bottom co. S. lav. Sp. Sh.

Leptocephalus æquoreus, Chrionema chryseres.

Station 3824. Depth 222 to 498 fathoms. Bottom co. R. brk. sh.

Etmopterus villosus, Neoscopelus macrolepidotus, Matæocephalus acipenserinus.

Station 3832. Depth 154 to 142 fathoms. Bottom br. M. S.

Pœcilopsetta hawaiiensis, Tæniopsetta radula, Anticitharus debilis.

Station 3834. Surface tow.

Diaphus chrysorhynchus.

Station 3836. Depth 238 to 255 fathoms. Bottom br. gy. M. S.

Promyllantor alcocki.

Station 3839. Depth 259 to 266 fathoms. Bottom lt. br. M. S.

Peristedion hians, Pelecanichthys crumenalis, Malthopsis mitrigera.

Station 3842. Depth 495 to 506 fathoms. Bottom fne. br. S. M. R.

Macrourus gibber.

Station 3846. Depth 64 to 60 fathoms. Bottom crs. br. S. Sh. G.

Engyprosopon xenandrus, Halieutæa retifera.

Station 3847. Depth 23 to 24 fathoms. Bottom S. St.

Uropterygius marmoratus, Ichthyocampus erythræus, Foa brachygramma, Holacanthus fisheri, Callionymus rubrovinctus, Calliurichthys decoratus.

Station 3848. Depth 44 to 73 fathoms. Bottom S. G.

Engyprosopon xenandrus.

Station 3849. Depth 73 to 43 fathoms. Bottom crs. S. brk. Sh. Co.

Synodus varius, Foa brachygramma, Sebastapistes coloratus, Scorpænopsis altirostris, Tænianotus citrinellus, Dendrochirus hudsoni, Ostracion galeodon, Osurus schauinslandi, Samariscus corallinus, Engyprosopon xenandrus.

Station 3850. Depth 43 to 66 fathoms. Bottom crs. S. brk. Sh. Co.

Uropterygius marmoratus, Synodus varius, Trachinocephalus myops, Canthigaster cinctus, Sebastapistes coloratus, Ostracion galeodon, Osurus schauinslandi, Engyprosopon xenandrus.

Station 3853. Depth 115 to 134 fathoms. Bottom crs. S. Sh.

Tæniopsetta radula, Malthopsis jordani.

Station 3855. Depth 130 to 127 fathoms. Bottom fne. br. S. G.

Halieutæa retifera.

Station 3856. Depth 127 fathoms. Bottom fne. S. yl. M.

Halieutæa retifera.

Station 3857. Depth 127 to 128 fathoms. Bottom fne S. yl. M.

Callionymus cæruleonotatus, Tæniopsetta radula.

Station 3858. Depth 128 to 138 fathoms. Bottom fne. S. gy. M.

Antigonia eos, Hoplichthys citrinus, Callionymus cæruleonotatus, Pœcilopsetta hawaiiensis, Tæniopsetta radula, Halieutæa retifera.

Station 3859. Depth 138–140 fathoms. Bottom fne. S. M.

Bembradium roseum, Hoplichthys citrinus, Tæniopsetta radula, Platophrys mancus, Platophrys coarctatus, Malthopsis jordani.

Station 3861. Depth 30 to 52 fathoms. Bottom fne. S. sm. P. Co.
Calliurichthys decoratus, Engyprosopon xenandrus.

Station 3865. Depth 256 to 283 fathoms. Bottom fne. vol. S. R.
Setarches remiger, Chalinura ctenomelas, Hymenocephalus antraeus, Pelecanichthys crumenalis, Malthopsis mitrigera.

Station 3866. Depth 283 to 284 fathoms. Bottom gy. M. fne. S.
Pelecanichthys crumenalis.

Station 3867. Depth 284 to 290 fathoms. Bottom fne. S. M.
Promyllantor alcocki, Chlorophthalmus proridens, Polyipnus nuttingi, Synagrops argyrea, Hynnodus atherinoides, Stethopristes eos, Setarches remiger, Peristedion hians, Chalinura ctenomelas, Optonurus atherodon, Malacocephalus hawaiiensis, Pelecanichthys crumenalis, Malthopsis mitrigera.

Station 3868. Depth 294 to 684 fathoms. Bottom fne. gy. S. R.
Ateleopus plicatellus, Malacocephalus hawaiiensis.

Station 3872. Depth 43 to 32 fathoms. Bottom yl. S. P. Co.
Uropterygius marmoratus, mionorus waikiki, Foa brachygramma, Holacanthus fisheri, Ostracion galeodon, Peloropsis xenops, Fierasfer microdon, Antennarius duescus.

Station 3873. Depth 32 to 37 fathoms. Bottom Co. P.
Fo brachygramma, Pseudocheilinus evanidus, Holacanthus fisheri, Osurus schauinslandi, Callionymus corallinus.

Station 3874. Depth 21 to 28 fathoms. Bottom S. P. Sh.
Sphagebranchus flavicaudus, Uropterygius leucurus.

Station 3875. Depth 65 to 34 fathoms. Bottom fne. gy. S.
Synodus varius, Fo brachygramma, Aniia maculifera, Chromis leucurus, Platophrys mancus, Engyprosopon xenandrus.

Station 3876. Depth 28 to 43 fathoms. Bottom S. G.
Uropterygius marmoratus, mionorus waikiki, Fo brachygramma, Cirrhilabrus jordani, Pseudocheilinus evanidus, Holacanthus fisheri, Osurus schauinslandi, Callionymus rubrovinctus.

Station 3878. Surface tow.
Myctophum margaritatum, Myctophum braueri, Myctophum evermanni, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 3883. Depth 277 to 284 fathoms. Bottom glob. Oz.
Leptocephalus aequoreus, Promyllantor alcocki, Setarches remiger, Hymenocephalus antraeus, Malthopsis mitrigera.

Station 3884. Depth 284 to 290 fathoms. Bottom glob. M.
Setarches remiger, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antraeus, Malacocephalus hawaiiensis, Pelecanichthys crumenalis.

Station 3885. Depth 136 to 148 fathoms. Bottom S. P.
Chaunax umbrinus.

Station 3887. Depth 552 to 809 fathoms. Bottom glob. M.
Halosauropsis kauaiensis.

Station 3888. Depth 809 fathoms. Bottom fne. yl. S. Glob.
Sternoptyx diaphana.

Station 3889. Surface tow.
Myctophum fibulatum, Dasyscopelus pristilepis.

Station 3892. Depth 328 to 414 fathoms. Bottom fne. gy. S.
Neoscopelus macrolepidotus, Hymenocephalus aterrimus.

Station 3898. Depth 258 to 284 fathoms. Bottom br. glob. M. fne. S.
Setarches remiger, Hymenocephalus antraeus.

Station 3899. Depth 284 to 283 fathoms. Bottom br. glob. M. fne. S.
Myctophum fibulatum, Lestidium nudum, Setarches remiger.

Station 3900. Depth 283 to 280 fathoms. Bottom br. glob. M. fne. S.
Promyllantor alcocki, Chlorophthalmus proridens.

Station 3904. Depth 295 fathoms. Bottom br. M. S. R.
Sternoptyx diaphana, Hymenocephalus aterrimus.

Station 3907. Depth 315 to 304 fathoms. Bottom fne. wh. S. M.

Hymenocephalus antræus, Malacocephalus hawaiiensis, Pelecanichthys crumenalis.

Station 3908. Depth 304 to 308 fathoms. Bottom fne. wh. S. M.

Chalinura ctenomelas, Hymenocephalus antræus, Pelecanichthys crumenalis.

Station 3909. Depth 308 to 322 fathoms. Bottom fne. wh. S. M.

Hymenocephalus antræus, Macrourus holocentrus, Pelecanichthys crumenalis.

Station 3910. Depth 311 to 337 fathoms. Bottom fne. gy. S. M.

Serrivomer beanii, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Coelorhynchus aratrum, Mataeocephalus acipenserinus, Pelecanichthys crumenalis.

Station 3911. Depth 337 to 334 fathoms. Bottom fne. gy. S. M.

Peristedion hians, Hymenocephalus antræus, Chalinura ctenomelas, Matæocephalus acipenserinus, Pelecanichthys crumenalis.

Station 3912. Depth 334 to 310 fathoms. Bottom fne. gy. S. M.

Promyllantor alcocki, Peristedion hians, Optonurus atherodon, Hymenocephalus antræus.

Station 3913. Surface tow.

Centrobranchus chœrocephalus, Dasyscopelus pristilepis.

Station 3914. Depth 289 to 292 fathoms. Bottom gy. S. M.

Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Cœlorhynchus aratrum, Malthopsis mitrigera.

Station 3916. Depth 299 to 330 fathoms. Bottom gy. S. M.

Chalinura ctenomelas, Hymenocephalus antræus.

Station 3917. Depth 330 to 294 fathoms. Bottom gy. S. M.

Sternoptyx diaphana, Peristedion hians, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Macrourus burragei, Matæocephalus acipenserinus, Malthopsis mitrigera.

Station 3918. Depth 294 to 257 fathoms. Bottom wh. S. M.

Ateleopus plicatellus, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Malthopsis mitrigera.

Station 3919. Depth 257 to 220 fathoms. Bottom gy. S.

Peristedion hians, Peristedion engyceros.

Station 3920. Depth 280 to 265 fathoms. Bottom gy. S. brk. Sh.

Chlorophthalmus proridens, Diaphus adenomus, Polyipnus nuttingi, Chlorophthalmus proridens, Synagrops argyrea, Peristedion hians, Peristedion engyceros, Chalinura ctenomelas, Hymenocephalus striatulus, Malacocephalus hawaiiensis, Pelecanichthys crumenalis, Symphurus strictus.

Station 3621. Depth 13 fathoms. Surface tow and dip nets, night anchorage off Honolulu. Bottom co. S. brk. Sh.

Diaphus chrysorhynchus.

Station 3925. Depth 323 to 299 fathoms. Bottom fne. gy. S. M. R.

Setarches remiger, Hymenocephalus antræus, Macrourus hebetatus, Malacocephalus hawaiiensis.

Station 3926. Surface tow.

Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Myctophum evermanni, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 3927. Surface tow.

Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Myctophum braueri, Myctophum evermanni, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 3929. Surface tow.

Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Dasyscopelus pristilepis.

Station 3930. Surface tow.

Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 3931. Surface tow.

Myctophum margaritatum, Myctophum evermanni.

Station 3932. Surface tow.

Centrobranchus chœrocephalus, Myctophum margaritatum, Myctophum evermanni.

Station 3938. Depth 148 to 163 fathoms. Bottom wh. S. brk. Sh.

Peristedion engyceros, Platophrys coarctatus, Malthopsis jordani.

Station 3939. Depth 163 to 59 fathoms. Bottom wh. S. brk. Sh. R.

Aracana spilonota.

Station 3940. Depth 59 to 70 fathoms. Bottom wh. S. brk. Sh.

Macrorhamphosus hawaiiensis, Platophrys mancus, Engyprosopon xenandrus.

Station 3941. Depth 70 to 146 fathoms. Bottom brk. Sh. rd. Corln.

Peristedion engyceros.

Station 3942. Depth 146 to 222 fathoms. Bottom wh. S. brk. Sh.

Setarches remiger.

Station 3943. Depth 222 to 100 fathoms. Bottom fne. wh. S.

Setarches remiger.

Station 3947. Depth 199 to 97 fathoms. Bottom fne. wh. S. brk. Sh.

Grammatonotus laysanus, Setarches remiger.

Station 3952. Depth 347 to 351 fathoms. Bottom wh. S. G. Co. R.

Chlorophthalmus proridens, Plectrogenium nanum, Hoplichthys platophrys.

Station 3957. Depth 220 to 173 fathoms. Bottom fne. wh. S.

Peristedion engyceros, Hoplichthys citrinus, Pteropsaron incisum, Pœcilopsetta hawaiiensis, Taeniopsetta radula, Anticitharus debilis, Platophrys inermis, Platophrys coarctatus.

Station 3958. Depth 173 to 182 fathoms. Bottom crs. wh. S.

Antigonia steindachneri, Pteropsaron incisum, Anticitharus debilis.

Station 3963. Depth 319 fathoms. Bottom wh. S. brk. Sh.

Engyprosopon xenandrus.

Station 3965. Depth 147 to 116 fathoms. Bottom co. S.

Aracana spilonota, Hoplichthys citrinus, Malthopsis jordani.

Station 3966. Depth 116 to 168 fathoms. Bottom crs. co. S.

Pteropsaron incisum.

Station 3968. Depth 14½ to 16½ fathoms. Bottom crs. S. Co.

Dascyllus albisella.

Station 3973. Depth 395 to 397 fathoms. Bottom crs. co. S. sh. Co. R.

Neoscopelus macrolepidotus.

Station 3977. Depth 876 fathoms. Bottom fne. co. S. For. R.

Halosauropsis kauaiensis, Gadomus bowersi.

Station 3979. Depth 222 to 387 fathoms. Bottom fne. wh. S. For. R.

Synaphobranchus brachysomus, Neoscopelus macrolepidotus, Optonurus atherodon, Matæocephalus acipenserinus, Malacocephalus hawaiiensis.

Station 3980. Surface tow.

Centrobranchus chœrocephalus, Myctophum margaritatum, Myctophum braueri, Myctophum evermanni, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 3981. Depth 636 to 414 fathoms. Bottom glob. Oz.

Cyclothone canina.

Station 3982. Depth 233 to 40 fathoms. Bottom crs. br. Co. S. Sh.

Chromis leucurus.

Station 3984. Depth 164 to 237 fathoms. Bottom fne. co. S.

Leptocephalus æquoreus.

Station 3985. Depth 477 to 430 fathoms. Bottom gy. S. For. Shore Deposit.

Halosauropsis verticalis, Hymenocephalus aterrimus, Macrourus gibber, Dibranchus erythrinus.

Station 3986. Depth 362 to 55 fathoms. Bottom gy. S. For. Shore Deposit.

Peristedion engyceros, Hymenocephalus striatulus.

Station 3988. Depth 165 to 469 fathoms. Bottom crs. co. S. co. Frag.

Leptocephalus æquoreus, Peristedion hians, Optonurus atherodon, Malacocephalus hawaiiensis.

Station 3989. Depth 733 to 385 fathoms. Bottom co. S. R.

Centroscyllium ruscosum, Halosauropsis kauaiensis, Snyderidia canina, Hymenocephalus aterrimus, Macrourus gibber.

Station 3993. Depth 218 to 201 fathoms. Depth fne. gy. S.

Peristedion engyceros.

Station 3994. Depth 330 to 382 fathoms. Bottom fne. gy. S. For.

Neoscopelus macrolepidotus, Macrourus gibber.

Station 3997. Depth 418 to 429 fathoms. Bottom fne. gy. S. br. M.

Centroscyllium ruscosum, Hymenocephalus aterrimus, Macrourus gibber, Trachonurus sentipellis.

Station 3998. Depth 235 to 228 fathoms. Bottom crs. br. co. S. Sh. R.

Lophiomus miacanthus.

Station 4001. Depth 277 to 230 fathoms. Bottom co. S.

Peristedion hians.

Station 4002. Depth 230 to 53 fathoms. Bottom fne. co. S. Glob. Co.

Osurus schauinslandi.

Station 4005. Depth 577 to 480 fathoms. Bottom fne. gy. S. For. R.

Cyclothone canina, Sternoptyx diaphana, Melamphaes unicornis.

Station 4007. Depth 508 to 557 fathoms. Bottom gy. S. For.

?Gadomus melanopterus juv., Gadomus bowersi, Macrourus gibber, Trachonurus sentipellis.

Station 4009. Surface tow.

Centrobranchus chœrocephalus, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 4010. Surface tow.

Myctophum margaritatum, Dasyscopelus pristilepis.

Station 4011. Surface tow.

Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Dasyscopelus spinosus.

Station 4014. Depth 399 to 362 fathoms. Bottom S. For.

Neoscopelus macrolepidotus, Macrourus gibber, Matæocephalus acipenserinus.

Station 4015. Depth 362 to 318 fathoms. Bottom gy. S. R.

Diaphus adenomus, Matæocephalus acipenserinus.

Station 4016. ?surface. Depth 318 to 305 fathoms. Bottom bk. S.

Diaphus urolampus.

Station 4017. Depth 305 fathoms. Bottom gy. S.

Argyropelecus heathi, Peristedion engyceros.

Station 4018. Depth 804 to 724 fathoms. Bottom for. S. mang. Frag.

Cyclothone canina, Halosauropsis kauaiensis, Trachonurus sentipellis.

Station 4019. Depth 724 to 409 fathoms. Bottom gy. For. R.

Synaphobranchus brachysomus, Metopomycter denticulatus, Cyclothone rhodadenia, Halosauropsis kauaiensis, Hymenocephalus aterrimus, Miopsaras myops.

Station 4021. Depth 286 to 399 fathoms. Bottom co. S. For.

Neoscopelus macrolepidotus, Stephanolepis pricei, Optonurus atherodon, Hymenocephalus antræus, Macrourus propinquus, Cœlorhynchus doryssus, Matæocephalus acipenserinus, Symphurus strictus.

Station 4022. Depth 399 to 376 fathoms. Bottom co. S. For. R.

Macrourus propinquus, Macrourus gibber.

Station 4024. Depth 24 to 43 fathoms. Bottom crs. co. S. For.

Osurus schauinslandi.

Station 4025. Depth 275 to 368 fathoms. Bottom fne gy. S. brk. Sh. For.

Neoscopelus macrolepidotus, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antraeus, Matæocephalus acipenserinus.

Station 4026. Depth 368 to 1,021 fathoms. Bottom fne. gy. S.

Cyclothone canina, Astronesthes lucifer, Sternoptyx diaphana.

Station 4028. Depth 444 to 478 fathoms. Bottom gy. S. Glob.

Gadomus melanopterus, Macrourus gibber, Trachonurus sentipellis.

Station 4030. Depth 423 to 438 fathoms. Bottom fne. co. S. For. R.

Trachonurus sentipellis.

Station 4031. Depth 27 to 28 fathoms. Bottom fne. co. S. For. Co.

Chætodon corallicola, Holacanthus fisheri.

Station 4032. Depth 27 to 29 fathoms. Bottom fne. co. S. For.

Chætodon corallicola, Holacanthus fisheri, Balistes bursa, Calliurichthys decoratus.

Station 4034. Depth 28 to 14 fathoms. Bottom fne. co. S. For.

Chætodon corallicola, Holacanthus fisheri, Osurus schauinslandi.

Station 4041. Depth 382 to 253 fathoms. Bottom gy. M. For.

Neoscopelus macrolepidotus, Optonurus atherodon, Macrourus gibber.

Station 4055. Depth 50 to 62 fathoms. Bottom fne. gy. S. For.

Sphagebranchus flavicaudus.

Station 4058. Depth 195 to 190 fathoms. Bottom rky.

Setarches remiger.

Station 4061. Depth 24 to 83 fathoms. Bottom co. S. Corln. Nod. For.

Sphagebranchus flavicaudus, Hippocampus fisheri, Pegasus papilio.

Station 4064. Depth 63 to 107 fathoms. Bottom vol. S. For. Co.

Halieutæa retifera.

Station 4066. Depth 176 to 49 fathoms. Bottom rky.

Callionymus cæruleonotatus, Engyprosopon xenandrus.

Station 4067. Depth 10 to 14 fathoms. Bottom fne. co. vol. S.

Trachinocephalus myops, Engyprosopon hawaiiensis.

Station 4068. Depth 14 to 18 fathoms. Bottom fne. gy. S.

Saurida gracilis.

Station 4070. Depth 45 to 52 fathoms. Bottom fne. gy. S.

Antigonia eos, Platophrys mancus, Engyprosopon xenandrus.

Station 4071. Depth 52 to 56 fathoms. Bottom fne. co. vol. S. For.

Canthigaster cinctus, Engyprosopon xenandrus.

Station 4072. Depth 56 to 59 fathoms. Bottom crs. co. S. For.

Antigonia eos, Engyprosopon xenandrus.

Station 4073. Depth 69 to 78 fathoms. Bottom crs. co. S. For.

Pseudocheilinus evanidus, Osurus schauinslandi, Engyprosopon xenandrus.

Station 4074. Depth 78 to 85 fathoms Bottom co. S. For.

Helicolenus rufescens, Platophrys chlorospilus.

Station 4075. Depth 49 to 57 fathoms. Bottom fne. gy. S. For.

Osurus schauinslandi, Engyprosopon xenandrus.

Station 4076. Depth 57 to 68 fathoms. Bottom co. S. Sh. For.

Engyprosopon xenandrus, Halieutæa retifera.

Station 4077. Depth 99 to 106 fathoms. Bottom fne. co. S. For.

Antigonia eos, Pontinus spilistius, Tæniopsetta radula, Neopercis roseoviridis, Platophrys inermis, Engyprosopon xenandrus.

Station 4079. Depth 143 to 178 fathoms. Bottom gy. S. For.

Synodus kaianus, Plectrogenium nanum, Peristedion engyceros, Hoplichthys citrinus, Bembrops filifera, Pœcilopsetta hawaiiensis, Platophrys coarctatus, Malthopsis jordani.

Station 4080. Depth 178 to 202 fathoms. Bottom gy. S. For.

Plectrogenium nanum, Peristedion engyceros, Hoplichthys citrinus, Bembrops filifera, Pœcilopsetta hawaiiensis, Chascanopsetta prorigera, Dibranchus stellulatus.

Station 4081. Depth 202 to 220 fathoms. Bottom gy. S. For.

Chlorophthalmus proridens, Plectrogenium nanum, Peristedion engyceros, Hoplichthys citrinus, Pœcilopsetta hawaiiensis.

Station 4082. Depth 220 to 238 fathoms. Bottom gy. S.

Chlorophthalmus proridens, Myctophum fibulatum, Setarches remiger, Plectrogenium nanum, Peristedion engyceros, Pœcilopsetta hawaiiensis.

Station 4083. Depth 238 to 253 fathoms. Bottom gy. S.

Peristedion engyceros, Pelecanichthys crumenalis.

Station 4084. Depth 253 to 267 fathoms. Bottom fne. gy. S.

Synagrops argyrea, Chalinura ctenomelas.

Station 4085. Depth 267 to 283 fathoms. Bottom S. Sh.

Squalus mitsukurii, Argyripnus ephippiatus, Peristedion hians, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Malacocephalus hawaiiensis.

Station 4086. Depth 283 to 308 fathoms. Bottom S. Sh.

Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Mataeocephalus acipenserinus.

Station 4087. Depth 308 to 306 fathoms. Bottom fne. gy. S.

Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Malacocephalus hawaiiensis.

Station 4088. Depth 306 to 297 fathoms. Bottom fne. gy. S.

Polyipnus nuttingi, Hymenocephalus antræus, Chalinura ctenomelas, Cœlorhynchus aratrum, Mataeocephalus acipenserinus, Malacocephalus hawaiiensis.

Station 4089. Depth 297 to 304 fathoms. Bottom fne. gy. S.

Polyipnus nuttingi, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Mataeocephalus acipenserinus, Malacocephalus hawaiiensis.

Station 4090. Depth 304 to 308 fathoms. Bottom fne. gy. S.

Promyllantor alcocki, Polyipnus nuttingi, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus antræus, Malacocephalus hawaiiensis.

Station 4091. Depth 308 to 306 fathoms. Bottom fne. gy. S.

Polyipnus nuttingi, Optonurus atherodon, Hymenocephalus antræus, Mataeocephalus acipenserinus.

Station 4094. Depth 753 to 787 fathoms. Bottom br. M. fne. S. Glob.

Melanobranchus micronema.

Station 4096. Depth 272 to 286 fathoms. Bottom fne. gy. S.

Chlorophthalmus proridens, Malacocephalus hawaiiensis, Lophiomus miacanthus, Malthopsis mitrigera

Station 4097. Depth 286 fathoms. Bottom fne. gy. S.

Polyipnus nuttingi, Chalinura ctenomelas, Optonurus atherodon, Malacocephalus hawaiiensis, Pelecanichthys crumenalis, Malthopsis mitrigera.

Station 4098. Depth 95 to 152 fathoms. Bottom co. S. For. R.

Pontinus spilistius, Chrionema squamiceps.

Station 4099. Depth 152 to 153 fathoms. Bottom fne. S. For. Sh.

Tæniopsetta radula.

Station 4101. Depth 143 to 122 fathoms. Bottom co. S. Sh. For.

Synodus kaianus, Champsodon fimbriatus, Tæniopsetta radula, Anticitharus debilis, Platophrys inermis, Malthopsis jordani.

Station 4102. Depth 122 to 132 fathoms. Bottom fne. gy. S. For.

Synodus kaianus, Synagrops argyrea, Antigonia eos, Draconetta hawaiiensis, Tæniopsetta radula, Platophrys inermis, Malthopsis jordani.

Station 4103. Depth 132 to 141 fathoms. Bottom fne. gy. S.

Hoplichthys citrinus, Tæniopsetta radula, Anticitharus debilis, Platophrys inermis.

Station 4104. Depth 141 to 123 fathoms. Bottom fne. gy. S. For.

Synodus kaianus, Antigonia eos.

Station 4105. Depth 314 to 335 fathoms. Bottom fne. co. S. For.

Sternoptyx diaphana, Hymenocephalus antræus.

Station 4106. Depth 335 to 350 fathoms. Bottom fne. S.

Diaphus adenomus, Hymenocephalus antræus, Trachonurus sentipellis.

Station 4107. Depth 350 to 355 fathoms. Bottom co. S. For.

Argyropelecus heathi, Optonurus atherodon, Trachonurus sentipellis.

Station 4108. Depth 411 to 442 fathoms. Bottom co. S. For.

Nannobrachium nigrum, Cyclothone rhodadenia.

Station 4109. Depth 442 to 449 fathoms. Bottom co. S. For.

Hymenocephalus aterrimus, Macrourus gibber, Cœlorhynchus doryssus, Trachonurus sentipellis.

Station 4110. Surface tow.

Nannobrachium nigrum, Cyclothone canina, Sternoptyx diaphana.

Station 4111. Depth 460 to 470 fathoms. Bottom fne. S. R.

Sternoptyx diaphana, Halosauropsis proboscidea.

Station 4112. Depth 447 to 433 fathoms. Bottom fne. S.

Macrourus gibber, Cœlorhynchus doryssus, Trachonurus sentipellis.

Station 4113. Depth 433 to 395 fathoms. Bottom co. ofr. S.

Macrourus gibber, Trachonurus sentipellis.

Station 4114. Depth 154 to 195 fathoms. Bottom co. S. For.

Hoplichthys citrinus, Symphurus undatus.

Station 4115. Depth 195 to 241 fathoms. Bottom co. S. For.

Chlorophthalmus proridens, Polymixia berndti, Peristedion engyceros.

Station 4116. Depth 241 to 282 fathoms. Bottom co. S. For.

Peristedion engyceros, Cœlorhynchus gladius.

Station 4117. Depth 282 to 253 fathoms. Bottom co. S. For.

Chlorophthalmus proridens, Diaphus chrysorhynchus (probably at surface), Peristedion engyceros, Chalinura ctenomelas, Malacocephalus hawaiiensis, Lophiomus miacanthus, Malthopsis mitrigera.

Station 4120. Depth 167 to 216 fathoms. Bottom co. S. F.

Hoplichthys citrinus, Pœcilopsetta hawaiiensis, Symphurus undatus.

Station 4121. Depth 216 to 251 fathoms. Bottom co. S. For. R.

Polyipnus nuttingi, Argyripnus ephippiatus.

Station 4122. Depth 192 to 352 fathoms. Bottom crs. co. S. Sh.

Leptocephalus æquoreus, Chlorophthalmus proridens, Cyttomimus stelgis, Setarches remiger, Peristedion hians, Chalinura ctenomelas, Optonurus atherodon, Hymenocephalus striatulus, Cœlorhynchus gladius, Cœlorhynchus doryssus, Malthopsis mitrigera.

Station 4123. Depth 352 to 357 fathoms. Bottom fne. gy. S. M.

Synaphobranchus brachysomus, Leptocephalus æquoreus, Optonurus atherodon.

Station 4126. Depth 1278 to 743 fathoms. Bottom gy. S. For.

Cyclothone canina.

Station 4128. Depth 68 to 90 fathoms. Bottom crs. br. co. S. For.

Canthigaster cinctus, Osurus schauinslandi, Engyprosopon xenandrus, Antennarius duescus.

Station 4130. Depth 283 to 309 fathoms. Bottom fne. gy. S.

Peristedion hians, Chalinura ctenomelas, Optonurus atherodon, Cœlorhynchus gladius, Malacocephalus hawaiiensis, Malthopsis mitrigera.

Station 4132. Depth 257 to 312 fathoms. Bottom fne. gy. S. M.

Chlorophthalmus proridens, Setarches remiger, Plectrogenium nanum, Peristedion hians, Peristedion engyceros, Cœlorhynchus gladius, Lophiomus miacanthus, Malthopsis mitrigera.

Station 4133. Depth 165 to 41 fathoms. Bottom fne. gy. S. R.

Helicolenus rufescens, Engyprosopon xenandrus.

Station 4134. Depth 324 to 225 fathoms. Bottom fne. co. vol. S.

Polyipnus nuttingi, Stethopristes eos, Peristedion hians, Chalinura ctenomelas, Malacocephalus hawaiiensis.

Station 4136. Depth 294 to 352 fathoms. Bottom fne. co. S.

Leptocephalus æquoreus, Peristedion hians.

Station 4137. Depth 411 to 476 fathoms. Bottom co. vol. S. For. R.

Synaphobranchus brachysomus, Neoscopelus macrolepidotus, Optonurus atherodon, Hymenocephalus aterrimus, Macrourus propinquus, Macrourus gibber.

Station 4138. Depth 438 to 476 fathoms. Bottom fne. br. S. R.

Halosauropsis proboscidea.

Station 4139. Depth 512 to 339 fathoms Bottom fne. gy. S. R.

Optonurus atherodon, Hymenocephalus aterrimus, Macrourus gibber.

Station 4140. Depth 339 to 437 fathoms. Bottom fne. gy. S.

Hymenocephalus antræus, Hymenocephalus aterrimus.

Station 4141. Depth 437 to 632 fathoms. Bottom vol. S. For.

Cyclothone canina, Halosauropsis verticalis, Gadomus bowersi, Macrourus gibber, Macrourus obliquatus.

Station 4142. Depth 632 to 881 fathoms. Bottom crs. mang. S. R.
Melamphaes unicornis.

Station 4145. Surface tow.
Centrobranchus chœrocephalus, Centrobranchus gracilicaudus, Myctophum margaritatum, Myctophum braueri, Myctophum evermanni, Dasyscopelus spinosus, Dasyscopelus pristilepis.

Station 4147. Depth 26 fathoms. Bottom Co. Corln.
Stephanolepis spilosomus.

Station 4148. Depth 26 to 33 fathoms. Bottom co. S. For.
Stephanolepis spilosomus.

Station 4149. Depth 33 to 71 fathoms. Bottom Co. Corln.
Pegasus papilio.

Station 4151. Depth 871 to 313 fathoms. Bottom fne. co. S. For. St.
Catulus spongiceps, Nematoprora polygonifera, Bathypterois antennatus, Halosauropsis verticalis, Gadomus bowersi.

Station 4154. Depth 636 to 850 fathoms. Bottom fne. wh. S.
Cyclothone canina, Sternoptyx diaphana.

Station 4155. Depth 1,164 to 1,594 fathoms. Bottom glob. Oz.
Caulolepis longidens, Sternoptyx diaphana.

Station 4157. Depth 762 to 1,000 fathoms. Bottom wh. M. For. R.
Serrivomer beanii.

Station 4158. Depth 20 to 30 fathoms. Bottom co. Corln.
Synodus varius, Osurus schauinslandi.

Station 4163. Depth 24 to 40 fathoms. Bottom co. S. P. Sh.
Cantharines sandvichensis.

Station 4164. Depth 40 to 56 fathoms. Bottom co. S. P. Sh.
Pegasus papilio.

Station 4166. Depth 293 to 800 fathoms. Bottom co. S. For. R.
Synaphobranchus brachysomus, Neoscopelus macrolepidotus, Steroptyx diaphana, Hymenocephalus aterrimus, Macrourus gibber.

Station 4167. Depth 18 to 20 fathoms. Bottom co. S.
Stephanolepis spilosomus.

Station 4176. Depth 672 to 537 fathoms. Bottom gy. S. M. For.
Stemonidium hypomelas, Collybus drachme.

Station 4180. Depth 426 to 417 fathoms. Bottom P. Glob. R.
Cyclothone canina, Hymenocephalus aterrimus.

Station 4183. Depth 957 to 1,067 fathoms. Bottom fne. gy. S. Glob.
Chimæra purpurescens, Serrivomer beanii.

Station 4185. Depth 1,000 to 1,314 fathoms. Bottom gy. S. M. For.
Bathypterois antennatus, Antimora microlepis, Macrourus longicirrhus.

Station 4188. Surface tow.
Centrobranchus chœrocephalus, Myctophum margaritatum.

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